IRON & COAL

THE IRON AND COAL TRADES' REVIEW

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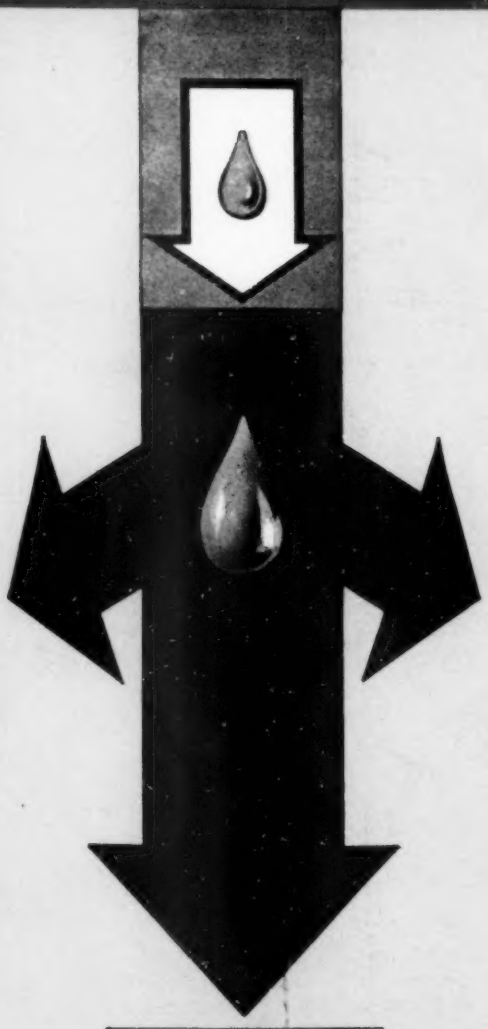

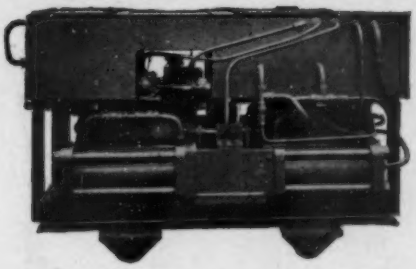

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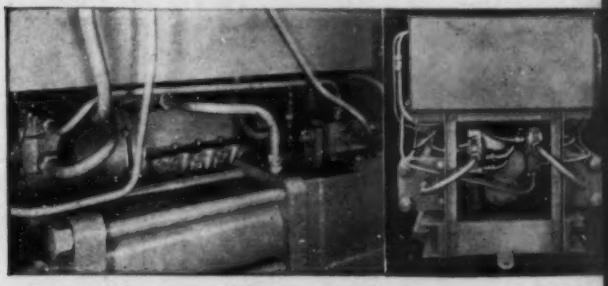

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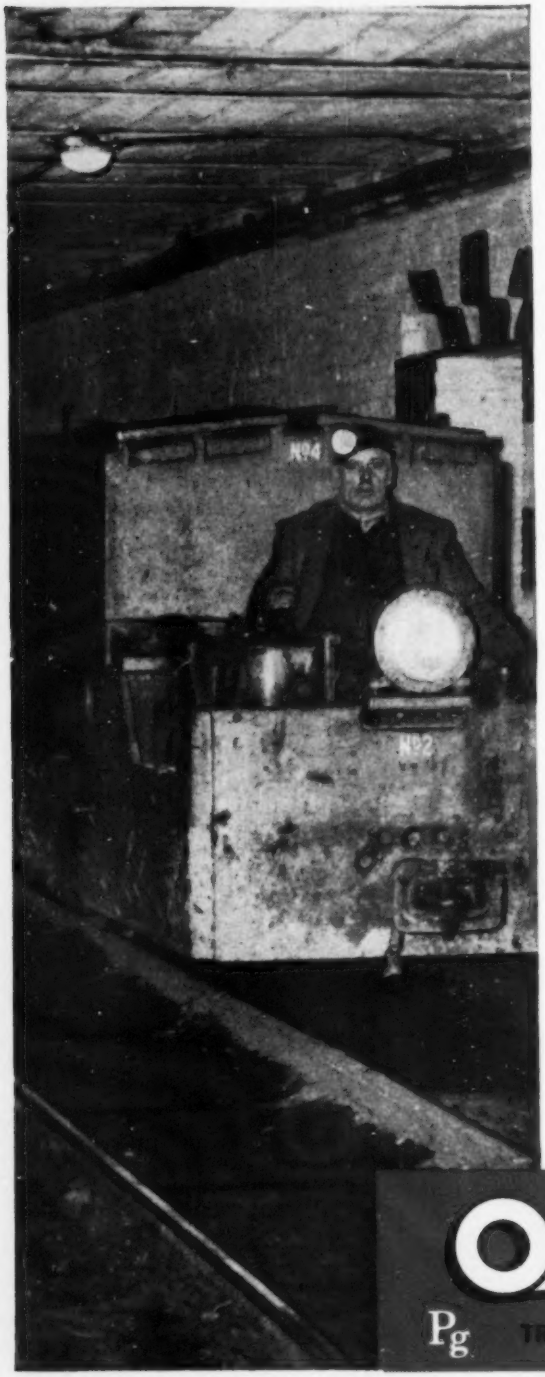

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Until now, many mines have been unable to take full advantage of battery-electric haulage. Today, since the introduction of the greatly advanced Oldham 'Pg' battery, they have gained the double benefit of cheaper haulage and longer battery shifts.

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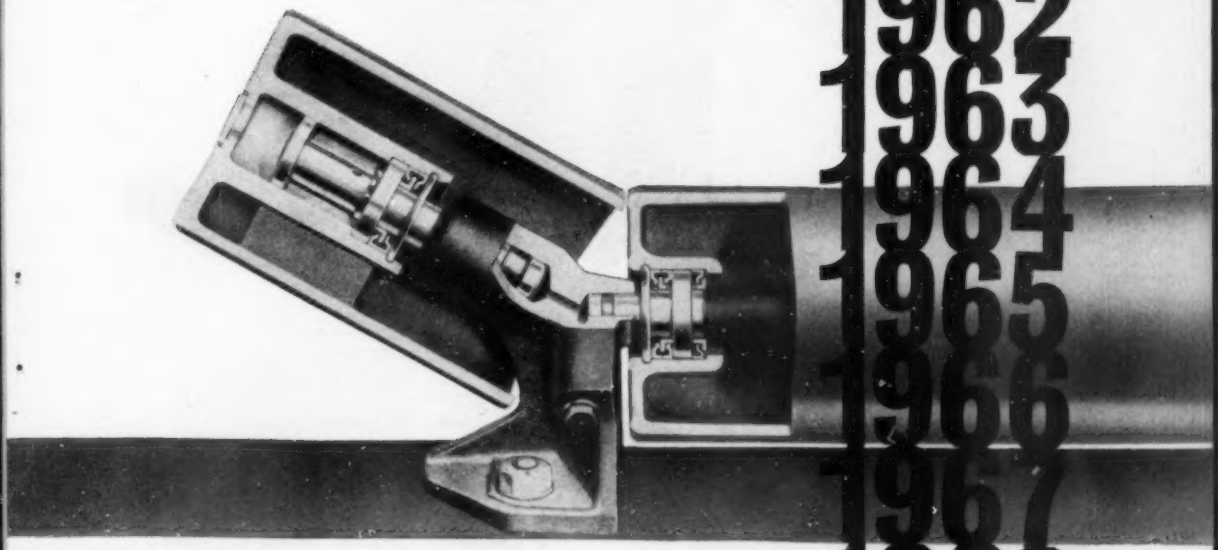

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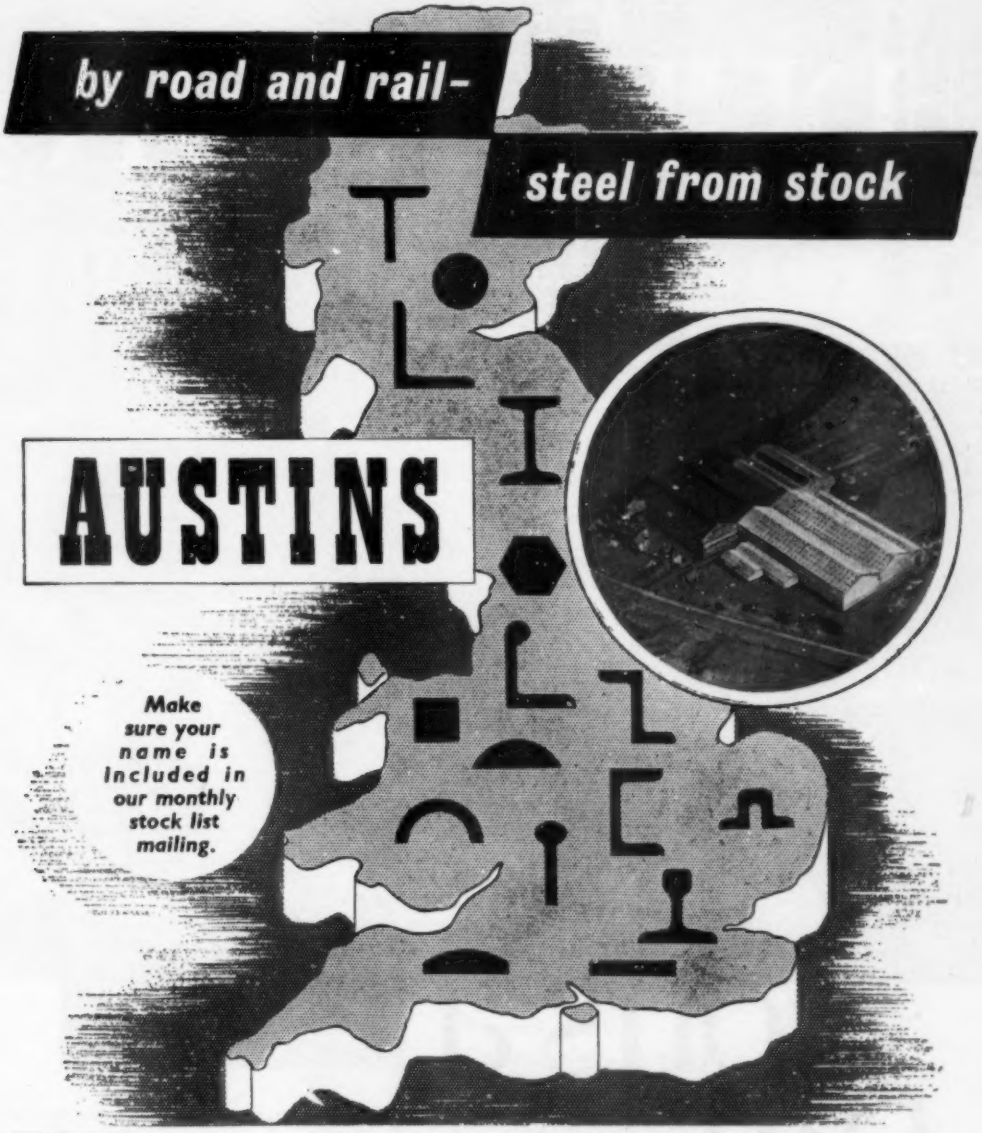

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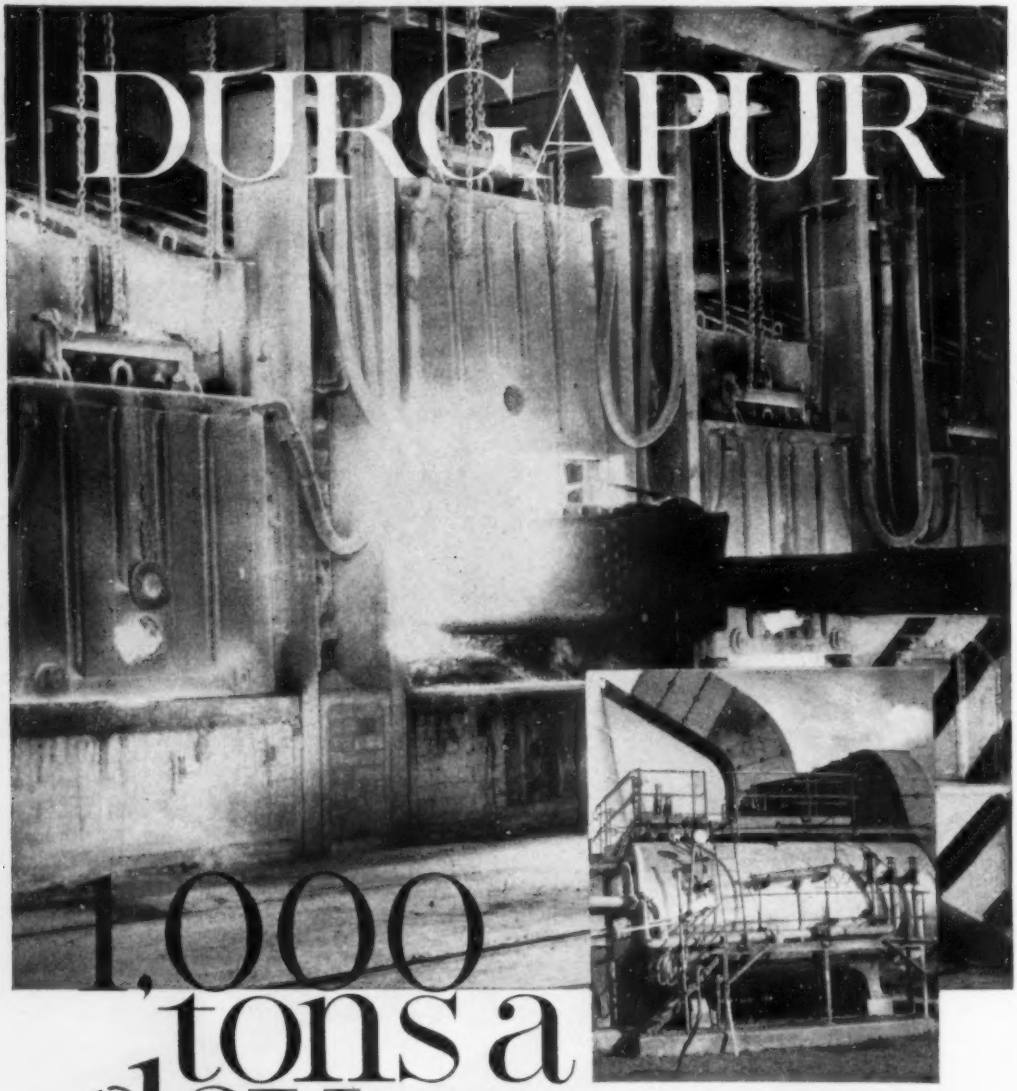

1,000 tons a day

but not only of steel. This is also the amount of steam generated by S-B-C waste heat boilers at Durgapur. The Spencer Bonecourt boiler shown above, inset, and six others like it, produces from 10,000 to 20,000 lbs of steam per hour—at 200 lbs per sq. in. S-B-C waste heat boilers were chosen by The Wellman Smith Owen Engineering Corporation Ltd., to operate in conjunction with their 200 ton open hearth melting furnaces for Indian Steelworks Construction Co. Ltd.

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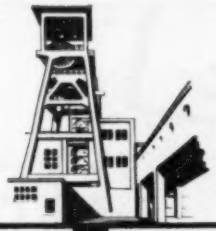

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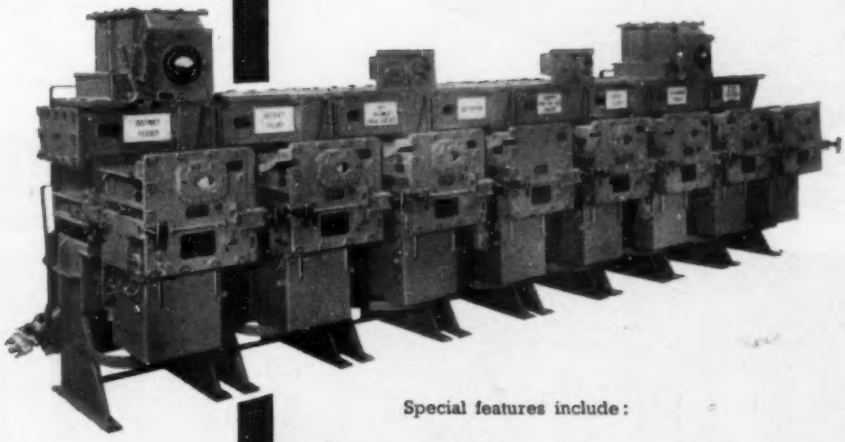
A new Reyrolle flameproof 400-ampere 6·6-kV 75-MVA distribution panel complying with the flameproof requirements of the Ministry of Power and carrying Buxton FLP Certificate No. 4446 (Group 1).



Special features include:

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- Air insulated back part to facilitate removal of components.
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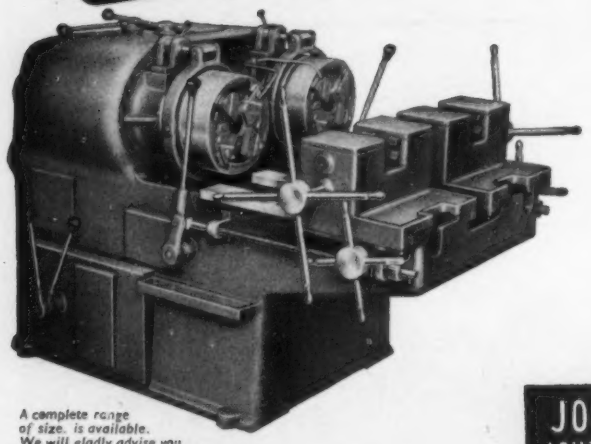
2½" DOUBLE HEAD BOLT SCREWING MACHINES



Designed for really high output the HEAP'S Automatic 2½ in. Bolt Screwing Machines will cut either right or left hand threads (or both at the same time). The machine is fitted with our patent TANGENTIAL Die Heads, which open automatically when any predetermined length has been threaded. Capacity: Bolts up to 2½ in. dia. pipes up to 2 in. dia. parallel or taper.

A complete range of size, is available. We will gladly advise you as to the most suitable machine for your requirement. Catalogue free on request.

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500/1000 H.P. Single Drum Winder with Oil Pressure Operated Brake Engine and Air/Oil Accumulator

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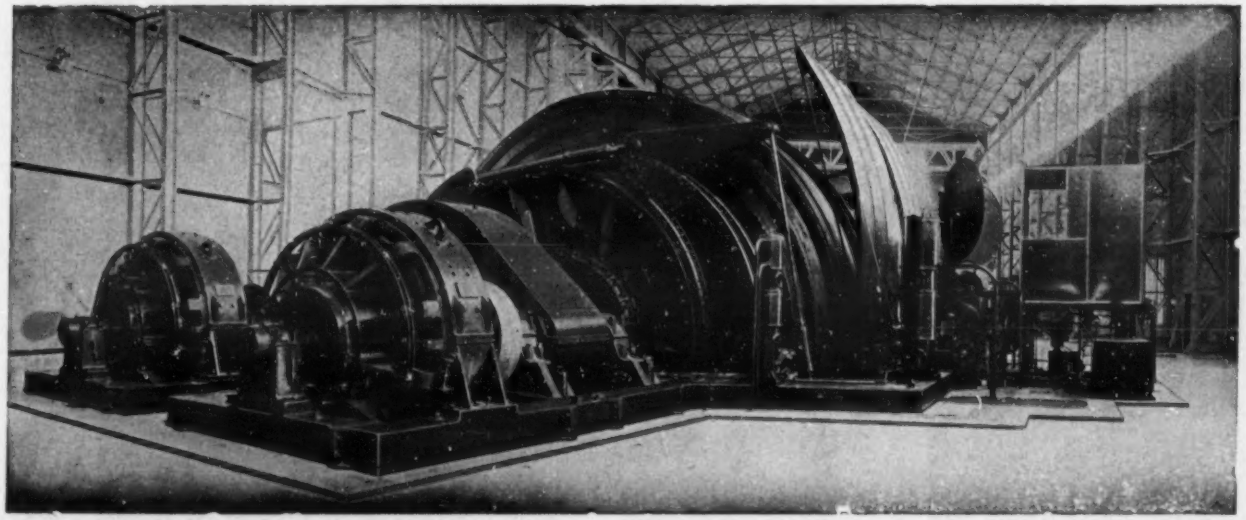

Gear Driven Double Central Drum Electric Winder. Drums 13/30ft. dia. Depth of wind 5,200ft. Vertical. This large Winder was one of two recently installed in South Africa.

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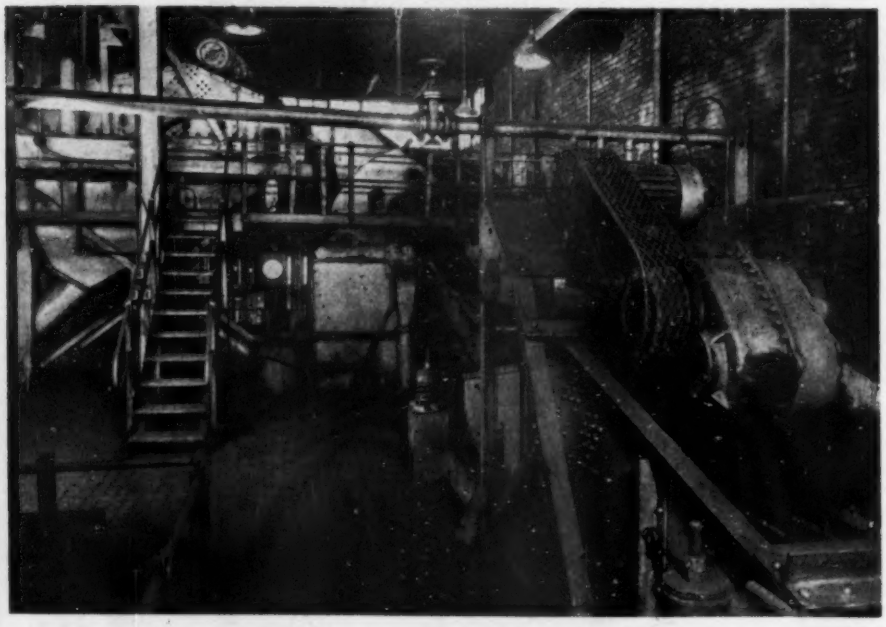

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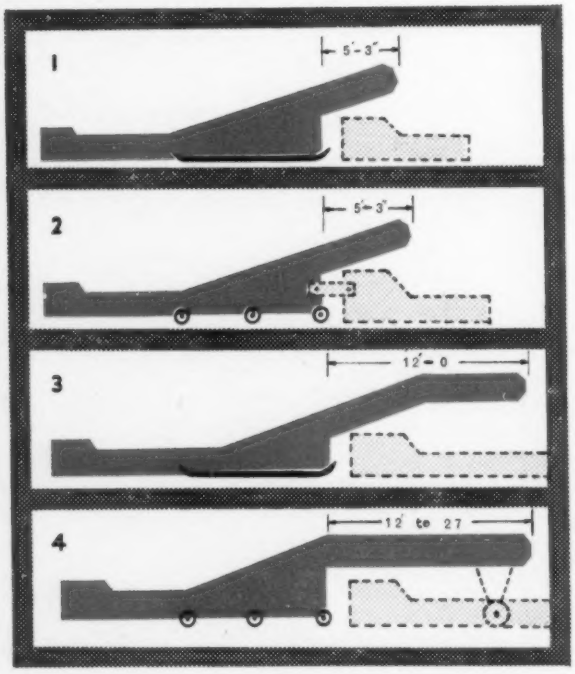

1 It may have a short jib and be mounted on a sledge.

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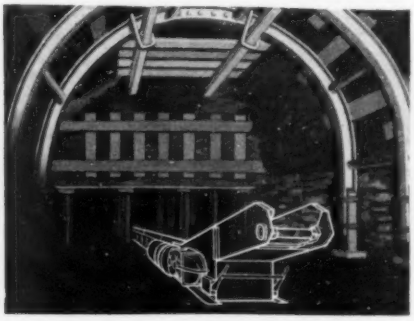

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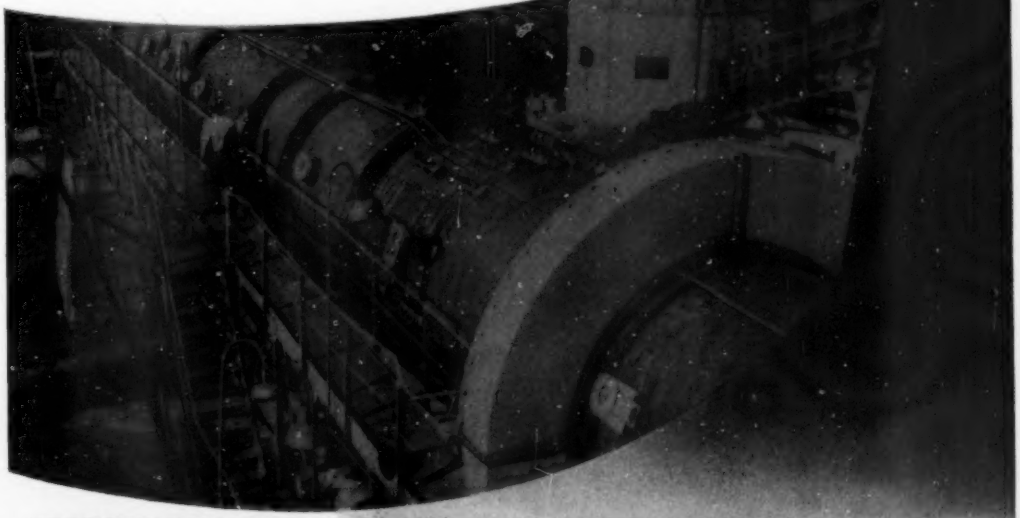
Under a non-exclusive arrangement with the R-N Corporation of New York, Head Wrightson will engineer and supply throughout the world complete plants using the R-N process for the direct reduction of iron ore with subsequent gangue separation and the production of briquettes of a very high iron content.

We invite you to write for full information on this new process. Our engineers are available to discuss the suitability of your own ore to this new method of direct reduction.

REMEMBER

- *The R-N process is not dependent upon the availability of coking coal.*
- *Capital and running costs are competitive with other direct reduction processes, but the R-N process has the technical advantage of subsequently removing the gangue.*
- *The R-N process can use ores and coal that today are not suitable for blast furnace plant.*
- *The R-N product is an excellent feed material for electric arc and open hearth furnaces as well as a convenient cooling material in oxygen converters.*



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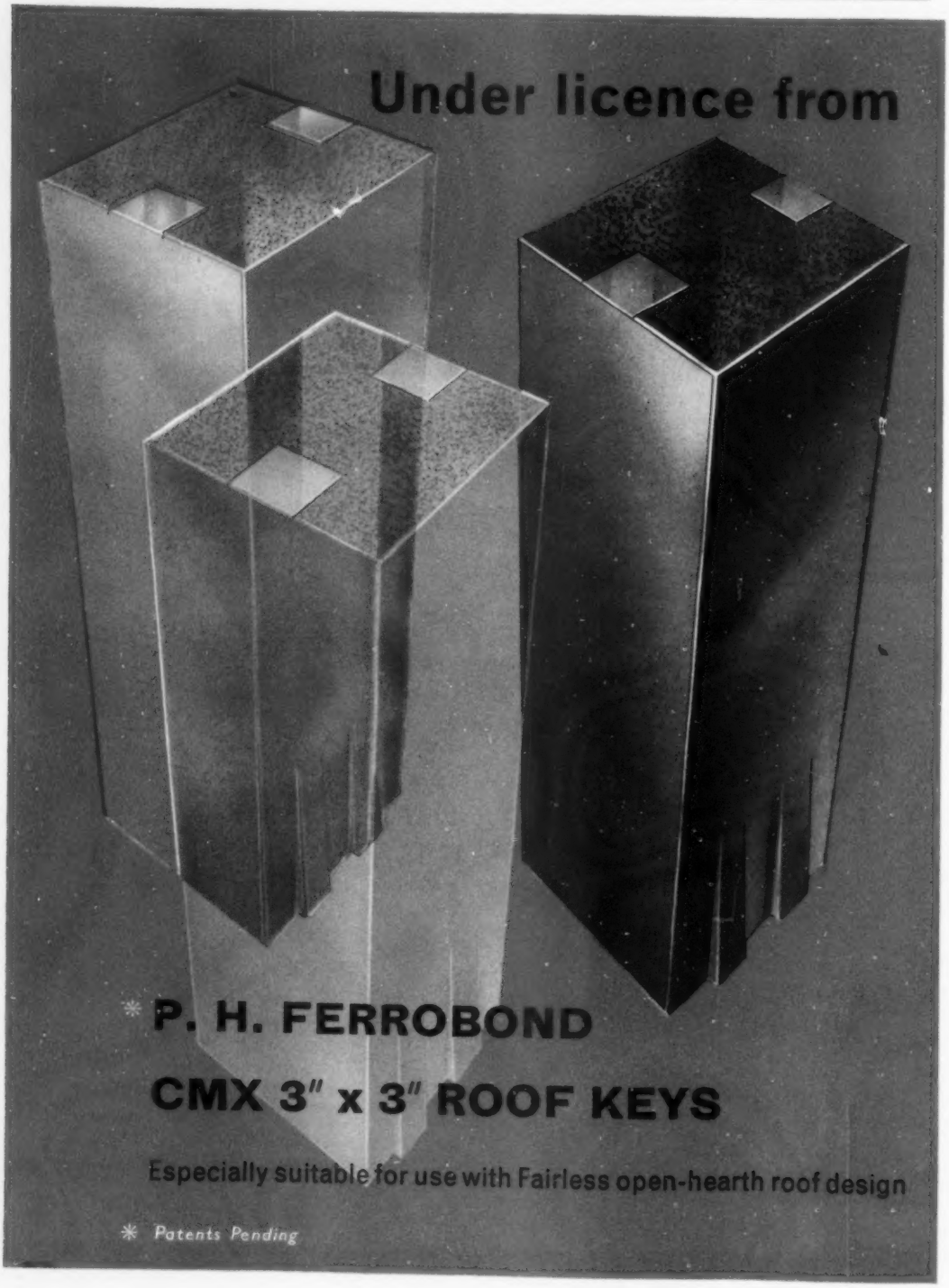
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Especially suitable for use with Fairless open-hearth roof design
* Patents Pending

America, Pickford Holland are now making to-day's most successful basic roof keys

The P.H. Ferrobond CMX 3" x 3" Roof Key is a new, metal-clad, chemically bonded basic open-hearth brick without internal plates, designed by E. J. Lavino & Co. of Philadelphia for maximum service and economy. A series of comparative tests with internally plated 4½" x 3" keys proved Ferrobond to be always equal, and usually superior, in performance. They are light and easy to handle, have built-in hot face expansion, and tabs ensure correct alignment. In addition, saving on material cost by rib and valley construction makes the P.H. Ferrobond beyond doubt today's outstanding value in basic roof brick. Considering a trial? Send drawings of your present roof to Pickford Holland who will redesign to suit Ferrobond bricks, and give you the assistance of a service engineer for installation.

See how split-roof tests prove OUTSTANDING PERFORMANCE by new FERROBOND ROOF KEYS

Furnace Capacity	Construction of Roof	Campaign Life	Total Tonnage Produced	Tons/ Hour	% AREA PATCHED		Oxygen Lances through Roof
					Lavino Ferrobond CMX 3" x 3" Keys	Metal Cased Internally Reinforced 4½" x 3" Keys	
190 Tons	12" Rib 9" Valley	284 Heats 112 Days	54,000 Tons	20	1.0%	1.6%	2
190 Tons	12" Rib 9" Valley	250 Heats 75 Days	47,500 Tons	26	2.2%	12.6%	2
190 Tons	All 12"	405 Heats 130 Days	77,000 Tons	25	62%	67%	2
200 Tons	15" Rib 12" Valley	488 Heats 196 Days	100,000 Tons	21	2.8%	6.6%	NONE
345 Tons	15" Rib 12" Valley	453 Heats 170 Days	157,000 Tons	38.5	18.4%	19.0%	2
400 Tons	15" Rib 12" Valley	298 Heats 186 Days	120,000 Tons	27	NIL	NIL	2

This chart shows comparative performance records in North America of six typical open hearth roofs. In each case the roof was constructed half-and-half of Lavino Ferrobond CMX 3" x 3" Roof Keys and Internally Plated 4½" x 3" Roof Keys. All were of the Fairless type roof construction (hold-up, hold-down). Production rate of tons per hour is based on total production over campaign time, and includes repair times, fettling times, and all lost time whatever the cause.

P.H. Ferrobond Roof Keys are manufactured under licence from E. J. Lavino & Company, Philadelphia, U.S.A. by

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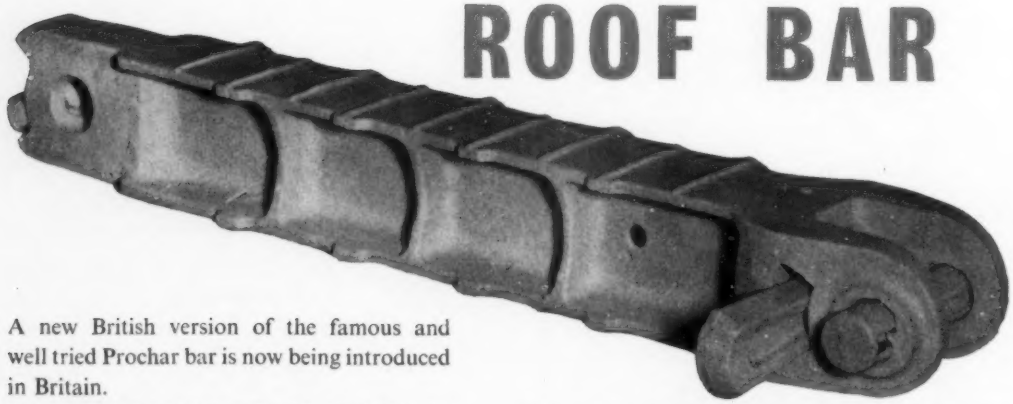
Introducing . . **THE NEW PROLLOY ROOF BAR**



A new British version of the famous and well tried Prochar bar is now being introduced in Britain.

It is being manufactured and marketed by LLOYDS (BURTON) LIMITED and is called the NEW Prolloy Roof Bar.

The new bar, fully approved by the National Coal Board, has been subjected to stringent tests on the surface and underground.

Many modifications and new ideas have been incorporated into the new design, all calculated to give better and more economical service where it is needed—underground.

For further details ask for the Prolloy Technical Engineers to call, or ask for the leaflet which gives brief details and specification of the NEW PROLLOY Roof Bar.

N.C.B APPROVAL No B.17

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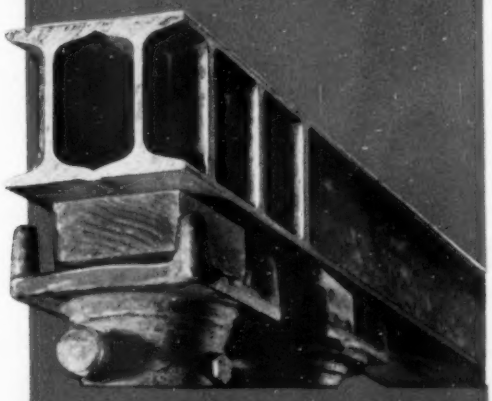
WHERE CONDITIONS ARE TOUGHEST INCREASE WORKING EFFICIENCY AND SAFETY ...WITH THE 'PROLLOY' ROOF BAR



New improved all British version made from high tensile cast steel "I" section bar, has staggered ribs for extreme resistance to twist and crush. Combined with high joint strength, these features result in ability to carry considerable cantilever tip loads. This bar also features captive joint members which are *easily replaceable underground*, fully retractable wedge for *free articulation of joint*, and specially shaped *replaceable tongue*, which takes all male end wear.

"N.C.B. Approval No. B.17"

THE S.M.R.E. ROAD HEAD BAR

The S.M.R.E. bar—the first bar designed and manufactured for the support of Roadheads and Stables.

Designed by the Safety in Mines Research Establishment, to reduce fatal accidents and improve efficiency at roadheads and stables. The bar is manufactured from two special joists of high tensile steel to BS 968, giving an effective distribution of material over the cross section with the consequent improvement in its strength/weight ratio, and stability. The capabilities of this are fully exploited by hardening and tempering the welded bar under close control in modern furnaces. This produces in the finished bar, the optimum combination of strength and ductility at the low weight of **16·5 lb./ft.**

The S.M.R.E. bar shows a greatly improved endurance compared with other sections in the same application. In some exacting installations, it has outlasted 6in. by 5in. R.S.J.'s, weighing **25 lb./ft.** by at least 10 times without failure.

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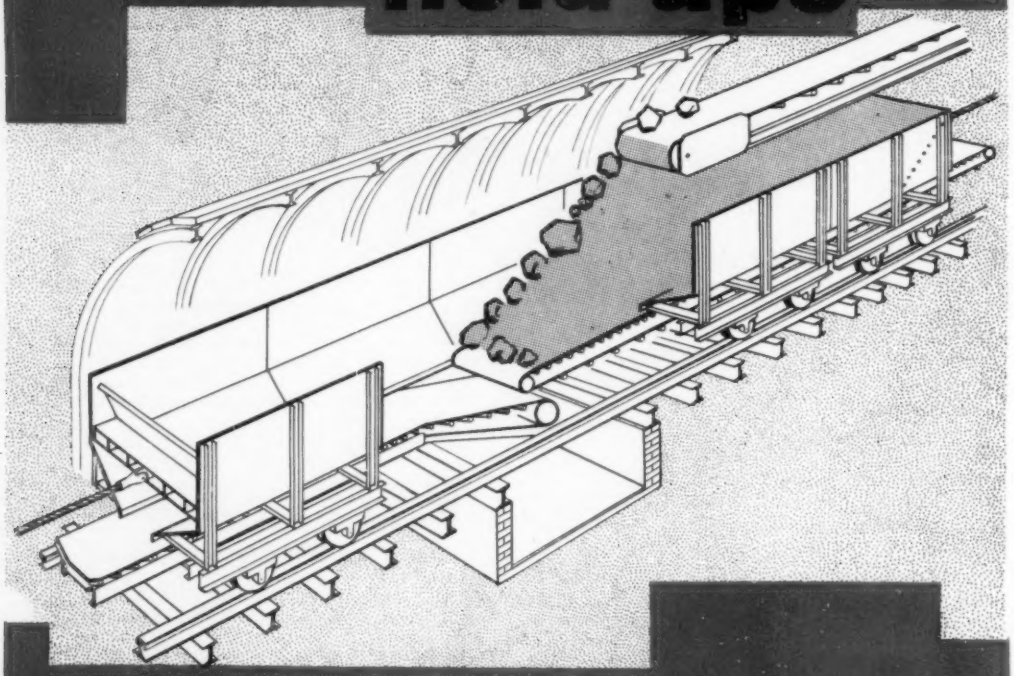
minimise production breakdown hold-ups



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Developed in No. 8 Area, East Midlands Division, N.C.B.

Now you can ensure a steady production flow during haulage and shaft breakdowns or derailments *with the absolute minimum of degradation*. The Walker-Horrocks Bunker collects coal from the inbye conveyor forming a reservoir of 50 to 400 tons (5 to 40 cars) during hold-ups. It can also be used as a Storage Unit for backshift working. Easily operated by the Transfer Point Attendant, the Bunker can be installed by normal pit labour. Installation does *not* interfere with normal working.

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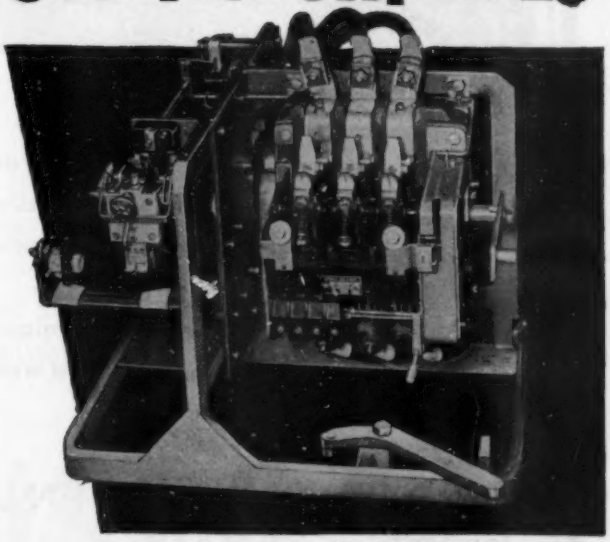
7. **Removable chassis.**
8. **Motor operated remote control if required.**



Interior with arc shield removed.

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The panel conforms to NCB Spec. P. 7/1950. Flameproof Certificates: FLP.3636 Gp 1. and 3637 Gp 11. Lock-out Intrinsic Safety Circuit Certificate IS 1016.

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VISCO design and supply Water Coolers of many types including natural and forced draught recirculating systems.

Air Filters

VISCO design and supply Air Filters for machinery, compressors, rolling mill motors, ventilating plant, diesel engines, etc.

Dust Collectors

VISCO Automatic Collectors draw off dust at point of generation thus avoiding harmful (or wasteful) liberation.

Call in VISCO LIMITED,
Stafford Rd., Croydon, Surrey. Croydon 4181

VISCO

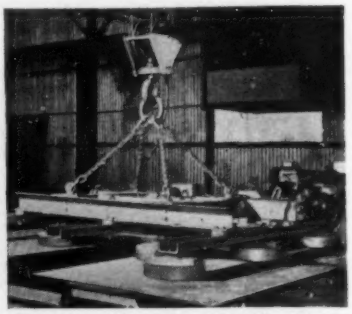
Contractors to Industry

FWS

WITTON-KRAMER ELECTRIC MAGNETS

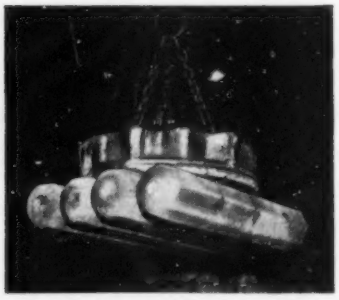
FOR ALL LIFTING PURPOSES

There are Witton-Kramer lifting magnets of all types to help you reduce your handling costs. Modern design and robust construction ensure their long life under severe operating conditions. That is why so many are being supplied for such a variety of duties.



A group of lifting magnets at the Manor Works of Joseph Sankey & Sons handling plates for the magnet yoke of a 7000 MeV proton-synchrotron.

Lifting pig iron at Round Oak Steelworks Ltd.



Lifting four ingots at the works of Taylor Brothers & Co. Ltd., Trafford Park. The total lift is about 13,440 lbs.

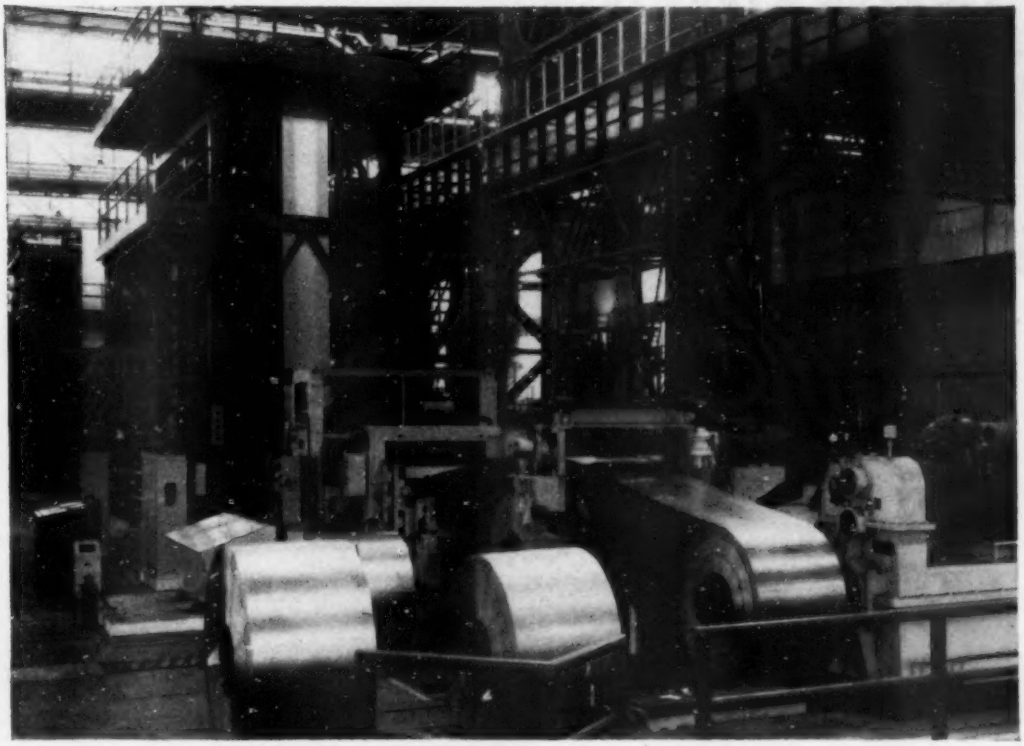
RELY ON THE EXPERIENCE OF G.E.C.

THE GENERAL ELECTRIC CO LTD OF ENGLAND · WITTON-KRAMER DIVISION · BIRMINGHAM 6

389

Another Electrolytic Tinning Line for Britain

The sixth Ferrostan electrolytic tinning line of Wean design to be installed in a British steelworks has now been commissioned for operation at the Trostre Works of The Steel Company of Wales Ltd.



WEAN-MILES LTD., designers and builders of equipment for British sheet and tinplate mills, are at present completing the engineering, manufacture and installation of new lines for:—

CONTINUOUS TINPLATE ANNEALING · CONTINUOUS STRIP PICKLING
SHEET SHEARING · SHEET SLITTING · TINPLATE INSPECTION

All this equipment is engineered and built to the designs developed by Wean, and incorporates specialized units of British design. British manufacturing facilities, labour and skill are employed throughout.

Wean-designed pickling, electrolytic cleaning, annealing, tinning, galvanizing and shearing equipment is extensively used throughout the world for processing and finishing tinplate and sheet-mill products, including stainless and silicon steels.

Their experience gained from close co-operation with the steel industries of the world for over 30 years is embodied in the equipment built in Britain by Wean-Miles Ltd.

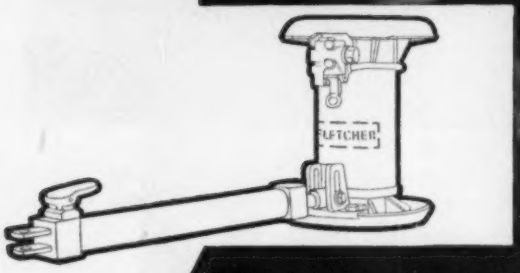
WEAN-MILES LTD.

MOOR HOUSE · LONDON E.C.2.

Telephone:- Metropolitan 0471 ***Cable:-Weanmil London***

FLETCHER DESFORD CHOCKS

in action



Photograph by courtesy NCB

Following successful installations in the East Midlands Division, the Fletcher Desford hydraulic chock has gained a reputation for reliability.

50 and 100 ton versions: 6″ to 18″ stroke at 2″ intervals.

Fully approved by N.C.B —H.15 and H.11.

Ancillary equipment by Fletcher includes:

double-acting hydraulic ram up to 2′-6″ stroke

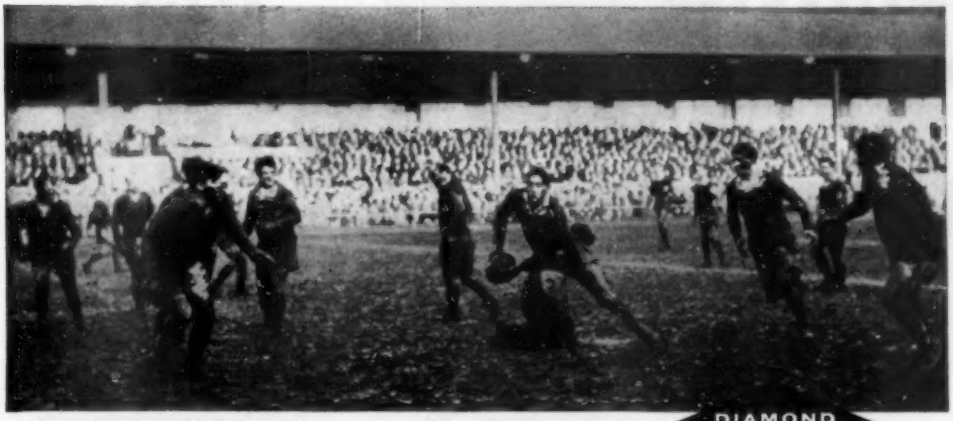
detachable ram anchor brackets

extension pieces 6″ & 12″

Full technical information from

GEORGE FLETCHER & CO. LTD., Masson Works, Litchurch Lane, DERBY · Telephone: Derby 45817 · Telex 37514

where wet conditions are a hazard



Photograph by courtesy of Hull Daily Mail

DIAMOND TYPE

Fenaplast

COLLIERY CONVEYOR BELTING

is the answer!

Like international forward John Whiteley,
Fenner Diamond type belting is a top-class performer under all conditions.
Why? Because the handling ability of Diamond belting is backed by a cover defence that withstands even the injurious attack of mine water.
The all-round strength of this new range of colliery conveyor belting eliminates breakdowns in vital movements—
puts an end to the penalty of production losses.
It is proving a winner in all tests . . . especially where wet conditions are a hazard.

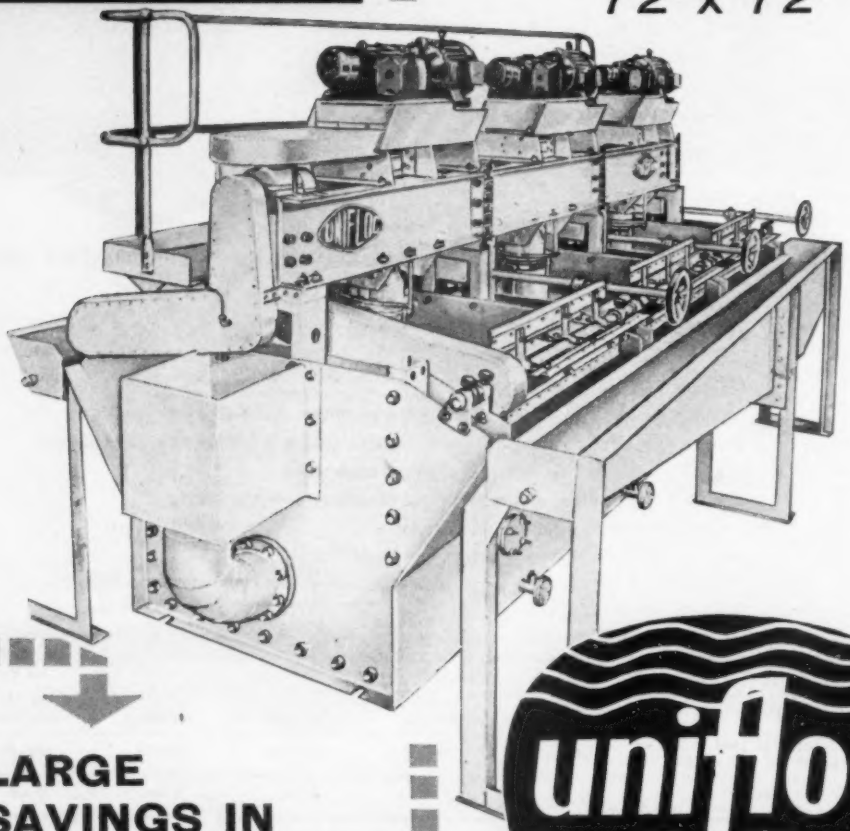
RANGE OF DIAMOND TYPE BELTINGS AVAILABLE					
N.C.B. APPROVAL NO.	150	158	149	158 HD	149 HD
TYPE	LIGHT DIAMOND	STANDARD DIAMOND	DOUBLE DIAMOND	HEAVY DIAMOND	EXTRA HEAVY DIAMOND
BREAKING LOAD MINIMUM PER INCH WIDTH	2000 LB	2000 LB	2500 LB	3000 LB	4000 LB
THICKNESS	7½ mm	8 mm	8 mm	8 mm	9 mm

J. H. FENNER & CO. LTD. HULL

LARGEST MAKERS OF V-BELT DRIVES IN THE COMMONWEALTH

FROTH FLOTATION

unifloc introduces the NEW SUPER CELL 72" x 72"

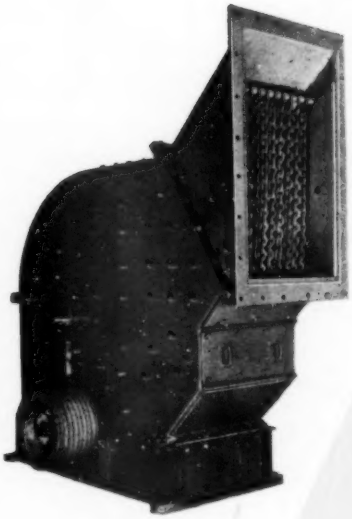


LARGE SAVINGS IN POWER, SPACE AND COST

unifloc

UNIFLOC LIMITED, SWANSEA, GREAT BRITAIN
TEL: 55164 (3 lines) GRAMS: 'UNIFLOC' S. WALES

Make an impact on STOWING



WAKEFIELD Impact Breakers give an excellent stowing product, free from slivers. Model 22, smallest in the range, is suitable for work close to the coal face, and the larger models for underground stowing stations.

WAKEFIELD Impact Breaker

BRITISH JEFFREY-DIAMOND LTD., WAKEFIELD, YORKSHIRE

WF 5231
2

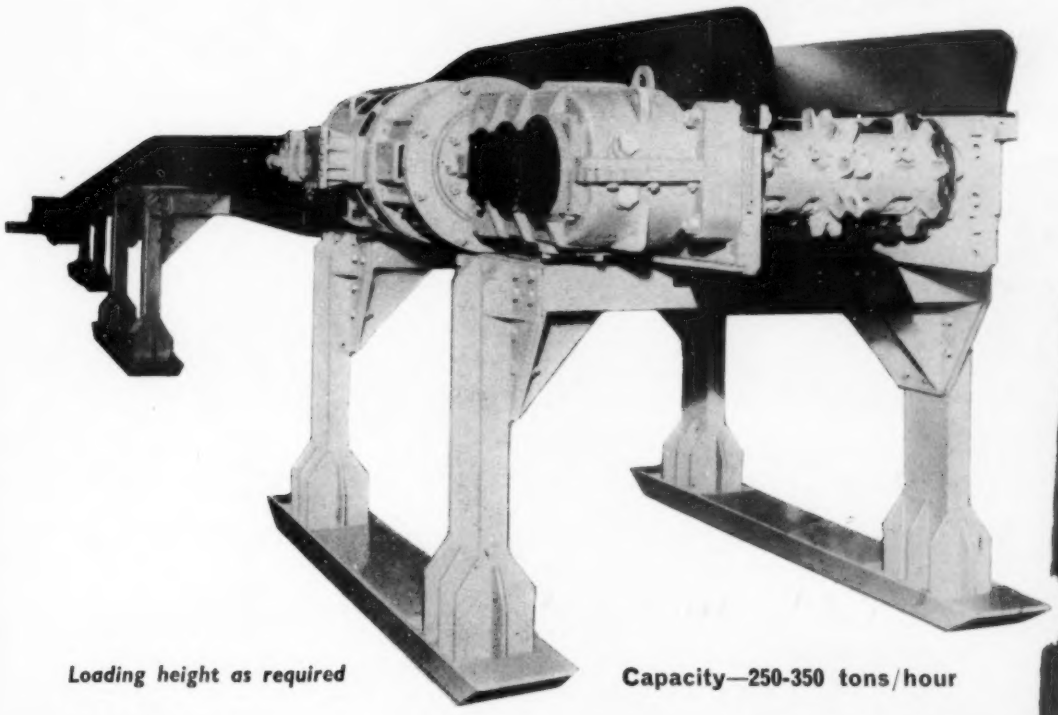
CRAWLEY

MINING EQUIPMENT

CRAWLEY WILCOX CONTINUOUS MINERS
CRAWLEY MIDGET MINERS
LO-HITE ARMOURED SNAKING CONVEYORS
HEAVY DUTY SNAKING CONVEYORS
STATIONARY BUNKER-CONVEYORS
MOBILE BUNKER CONVEYORS
EXTENSIBLE STAGE LOADERS
MOBILE STAGE FEEDERS
MOBILE STAGE LOADERS
EXTENSIBLE TUB LOADERS
MOBILE & EXTENSIBLE STAGE
COAL BUNKER UNITS

Write for **CRAWLEY** *"Mining Equipment" Catalogue NOW!*

THE CRAWLEY HEAVY DUTY SKID MOUNTED STAGE LOADER



Loading height as required

Capacity—250-350 tons/hour

Overall width—

Extra Heavy Duty Extensible Stage Loader, treble strand 18-mm. chain .. .. 30 in. & 36 in.

Heavy Duty Extensible Stage Loader, double strand 18-mm. chain .. .. 24½ in.

Lo-hite Extensible Stage Loader, double strand 13 or 14-mm. chain .. .. 24½ in., 30 in. & 36 in.

Designed basically to deal with the problem of extension of plate belt conveyors, so that the equipment gives the minimum coverage over the discharge unit, but is extensible by the addition of pans and chains up to an overall length of 150 yards, thus avoiding frequent and expensive extensions to the plate belt conveyor, and can be supplied with N.C.B. recommended drive frame and gear box at request.

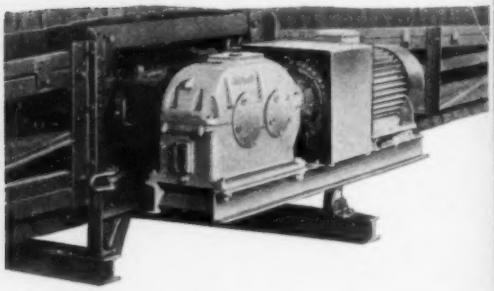
All Crawley Heavy Duty Machines have the following units standard and interchangeable:

Drive Frame · Gear Box · Gear Assemblies · Extension Sections · Structure · Tail Unit · Chain Flights

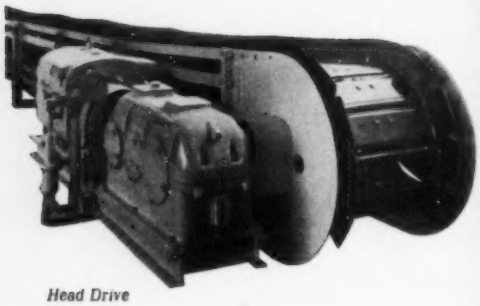
CRAWLEY INDUSTRIAL PRODUCTS LTD · LLANELLY
CARMARTHENSHIRE · S. WALES · Tel: Llanelly 4233

AYLING INDUSTRIES GROUP

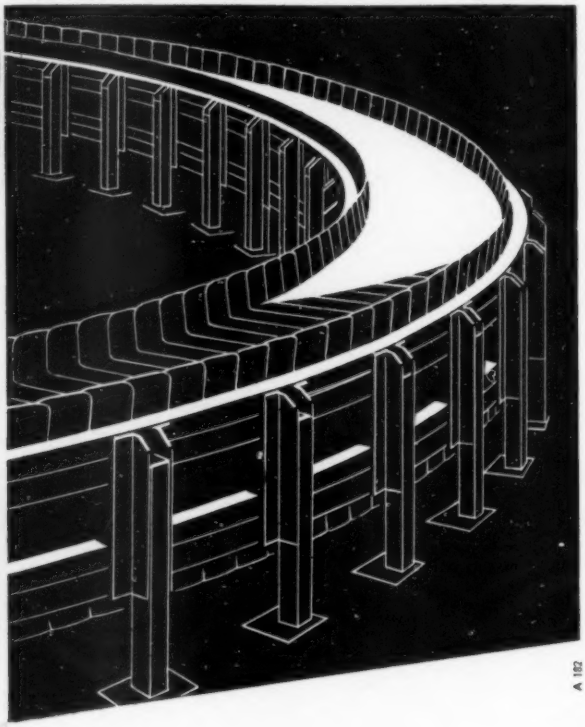
CRAWLEY



Intermediate Drive



Head Drive



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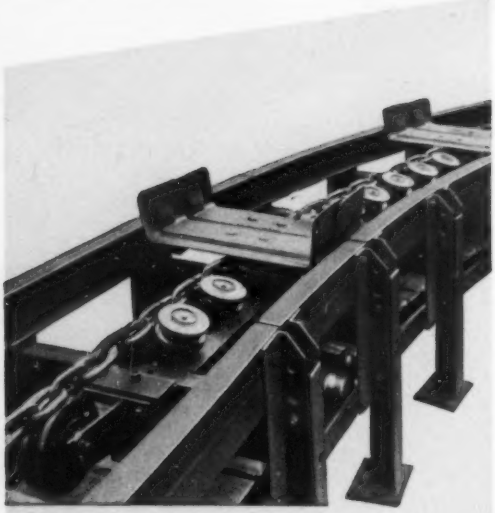


for bends with a 20′ radius

Eickhoff

PLATE CONVEYORS

with Round-Link Chains

capable of negotiating bends in road ways with only 20′ radius.

Available for widths of 400, 540 and 640 mm.

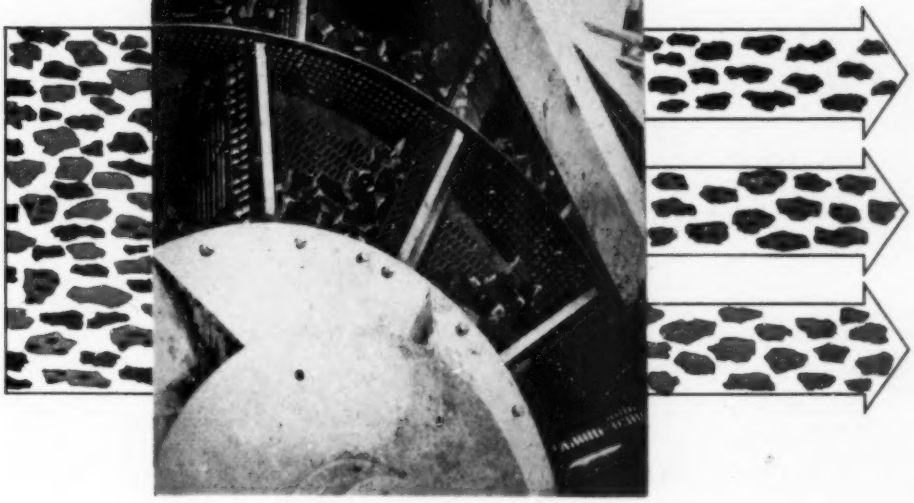
The Head Drive, Type T, powered by 2 electric motors of 50 HP each is designed for running speeds from 3′ to 4′/sec.

By changing the drive sprocket, Type T can also be converted for use with strap-link type chain conveyors.

For trunk conveying 30 HP Intermediate Drives, Type TZ II, can be installed in the line of conveyor. Ingeniously controlled carrier claws are the special feature of the driving chains in the Intermediate Drive (DBP No. 1004545)

REPRESENTATIVE IN GREAT BRITAIN: E. WHEATLEY LTD., 13. ROCKINGHAM STREET, SHEFFIELD 1, TEL. 25774

THREE FROM ONE



This new dense-medium three-product separator, designed and developed by Simon-Carves, segregates raw coal three ways, into clean coal, middlings and dirt. One Simon-Carves three-product separator does in one operation the work of two two-product separators working in series, thus saving plant space and overall capital cost.
All sizes from 10" down to 1/8" can be efficiently treated and accurate separations are made at any combination of separating densities between 1.30 and 1.90.

COAL PREPARATION PLANT BY

Simon-Carves Ltd

MEMBER COMPANY SIMON ENGINEERING LTD

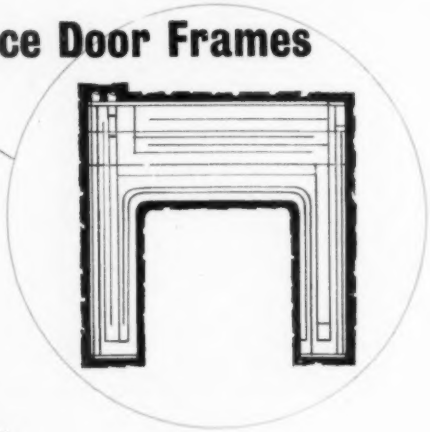
CHEADLE HEATH · STOCKPORT · ENGLAND

and at CALCUTTA · JOHANNESBURG · SYDNEY · TORONTO

SC263.PS

JOHN THOMPSON

and Open Hearth Furnace Door Frames



At the Redbourn Works, Scunthorpe, of Richard Thomas & Baldwins Limited, some lintels of the charging doors on the S.M.O.H. furnaces have been in service for several months. Three of these door frames are producing approximately 6,000 lb/hr of steam at 200 lb/sq. in.g. They are connected to the John Thompson-La Mont waste heat boilers located in the furnace flues by means of the common circulating system.

These are the first British designed and manufactured door frames to operate in this country.

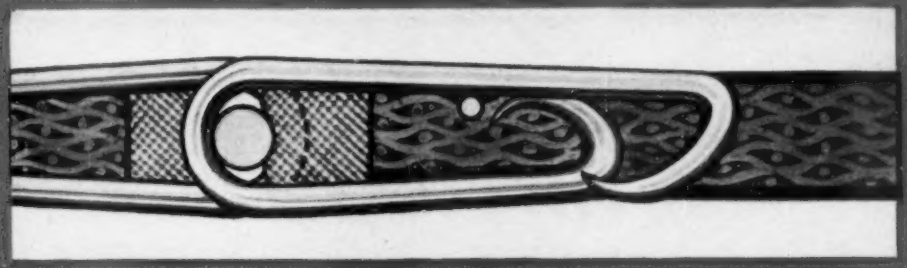
John Thompson drew on their wide experience of forced circulation systems and carried out prototype testing, built models to facilitate fabrication, and ensured that the construction was sufficiently robust to withstand onerous service conditions.

Door frames can be operated in conjunction with shell type waste heat boilers, and can be individually tailored to suit the shape of existing atmospheric cooled lintels.

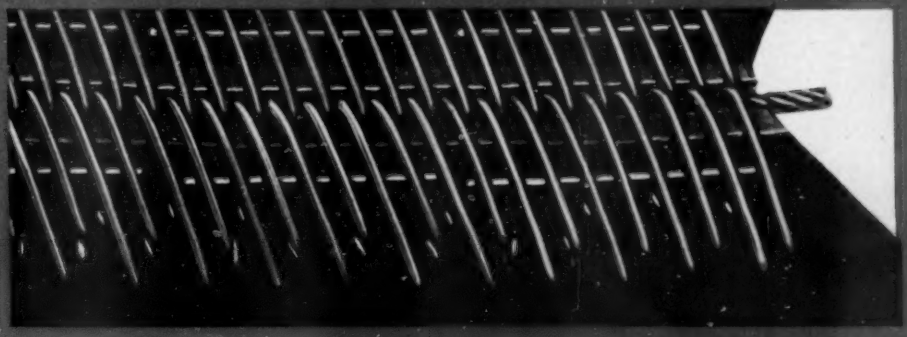
JOHN THOMPSON WATER TUBE BOILERS LIMITED · WOLVERHAMPTON

WTB/20

ONLY COMET FASTENERS



with the **Wedge action Clench**



give **Increased joint strength**

The profile of Comet's ground point, its smoothness and final plating ensure clean penetration with least disturbance of belt fabric....angle of entry and Comet's special wedge-action clench add greater strength to the joint.

On test, on the face, a Comet joint is stronger....longer.

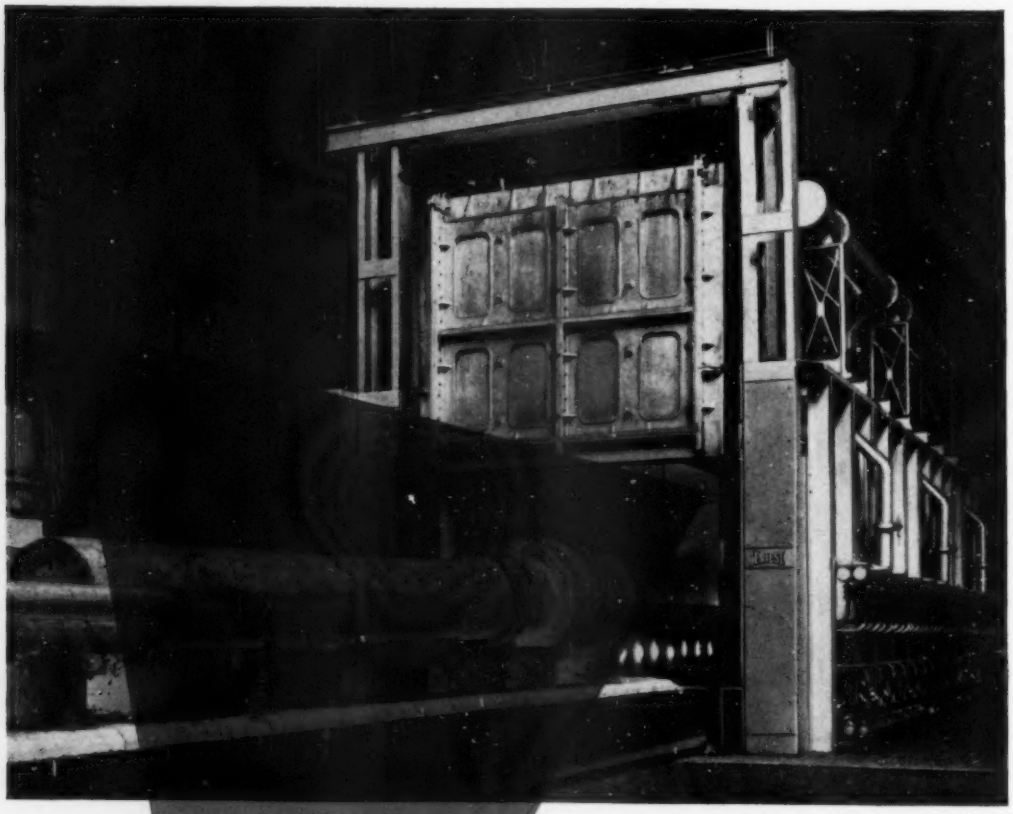
Comet

COLLIERY CONVEYOR BELT LACING SYSTEM

MASTABAR MINING EQUIPMENT CO. LTD.

AVENUE PARADE • ACCRINGTON • LANCASHIRE • TELEPHONE: 35411 (3 LINES)

SALES & SERVICE DEPOTS: CARDIFF • LONDON • NOTTINGHAM • LEEDS • ACCRINGTON • NEWCASTLE-UPON-TYNE



Town's Gas Fired

Bogie Type

Heat Treatment

Furnace

The illustration shows one of a pair of Bogie Hearth Furnaces, 50 feet long by 10 feet wide, supplied to William Beardmore & Company Limited, Glasgow. Specifically designed and zoned for extended accurate heat treatment of specialised materials.

We specialise in the design and construction of:—

Open Hearth Furnaces.

Soaking Pits of all types.

Continuous Multi-zone Bloom and Slab Re-heating Furnaces.

Continuous Bogie type Ingot and Slab Heating Furnaces.

Furnaces for Aluminium Melting, Coil Annealing and Slab Re-heating.

Forge and Heat Treatment Furnaces.

Stress Relieving Furnaces.

Shipyard Plate and Bar Furnaces.

Modern Lime Burning Kilns.

PRIEST

PRIEST FURNACES LIMITED · LONGLANDS · MIDDLESBROUGH also at KELHAM ISLAND WORKS · SHEFFIELD 3

F 158

With the Hanmade Anti-breakage Storage Bunker haulage breakdowns, derailment or shaft hold-ups need not stop production. Normally coal can proceed "straight through" but in the case of bottle necks out-bye of the bunker, production can be turned into the Bunker and unloaded later in the shift.
Advantages?
Greater flexibility of output, less coal degradation and increased production.

Requires only one man to operate.

Developed in conjunction with the Mechanization Dept. of Area 1 East Midlands Division of the National Coal Board.

hanmade anti-breakage storage bunker

HANMADE CONVEYOR CO. LTD., WINIFRED STREET, HUCKNALL NOTTS. Telephone 3448/9

BRITISH STEEL AT ITS BEST

CARBONS UP TO 1.0%
DEEP STAMPING & RIMMING,
FREE CUTTING,
LEAD BEARING.

A MEMBER OF THE GKN GROUP OF COMPANIES

LYSAGHT'S SCUNTHORPE

LYSAGHT'S SCUNTHORPE WORKS
Branch of G.K.N. Steel Company Limited

NORMANBY PARK STEEL WORKS.
Telex No. 56176

SCUNTHORPE, LINCOLNSHIRE.
Telephone: SCUNTHORPE 2871 (7 lines.)

The man on the spot...

HUWOOD *Slung Structure*

Much of the present-day demand for conveyor structure which can be suspended from the roof has been created by the availability of Huwood Slung Structure—the first choice of a growing number of those mining engineers whose judgment in such matters is sharpened by day-to-day experience.

In common with many other Huwood elevated structures for use in gate and trunk roads, Huwood slung structure is based on the F.T. section which is fitted throughout with Huwood self-lubricating oil-filled rollers and is one of the most robust and serviceable conveyor sections used in present-day mining.

HUGH WOOD & CO. LTD.

Head Office and Factories:
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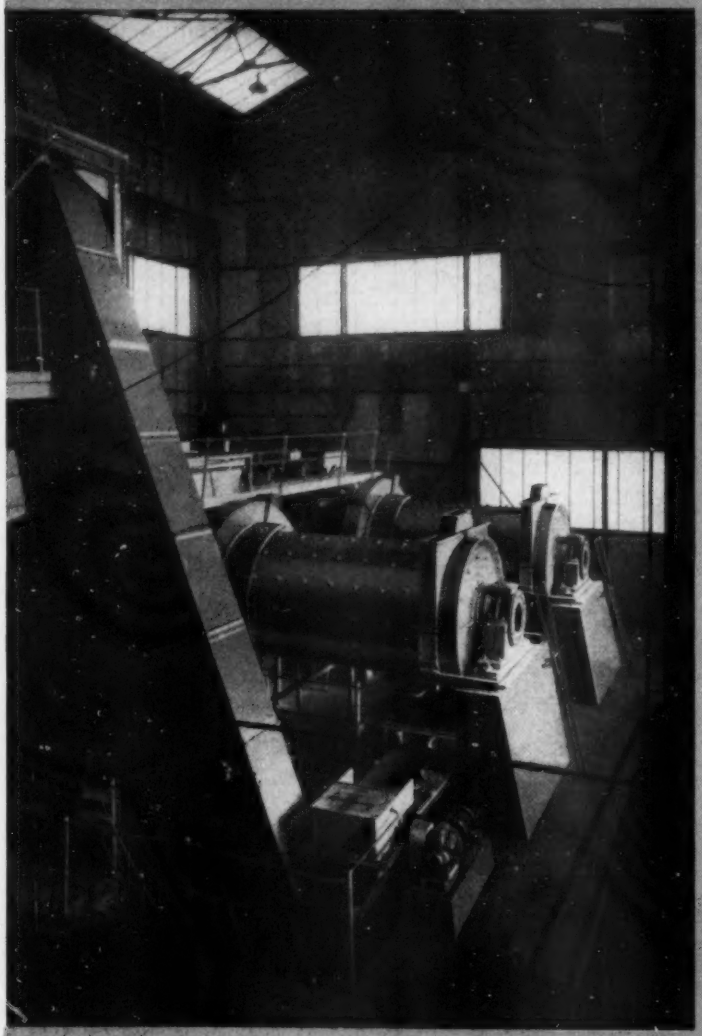
Grams: Huwood, Gateshead. Phone: Low Fell 76083 (5 lines). Grams: Huwood Stock, London, Phone: Monarch 3273 (4 lines)

F/FA/202

RAW MATERIAL PREPARATION PLANTS FOR STEELWORKS.



Exclusive Design

PATENTED ROD MILLS PRODUCING FINE CRUSHED COKE.

INSTALLED IN LEADING BRITISH AND CONTINENTAL STEELWORKS.

OTHER EQUIPMENT SPECIALLY DESIGNED FOR STEEL WORKS:—

- PATENTED ROTATING DRUM & SCROLL MIXERS.
- HEAVY DUTY TABLE & APRON FEEDERS.
- ORE CRUSHING AND GRADING PLANTS.
- PLANTS FOR PRODUCING BASIC SLAG.
- LIMESTONE CRUSHING & SCREENING PLANTS.

FOR WELL OVER 25 YEARS NEWELLS HAVE SUPPLIED 80 INSTALLATIONS SIMILAR TO THE ABOVE TO LEADING STEEL MANUFACTURERS AND COAL OVENS AT HOME AND ABROAD, MANY OF WHICH ARE REPEAT ORDERS. MANUFACTURING EXPERIENCE COUPLED WITH HIGH QUALITY WORKMANSHIP ENSURES FULL WORKING SATISFACTION.

Newells

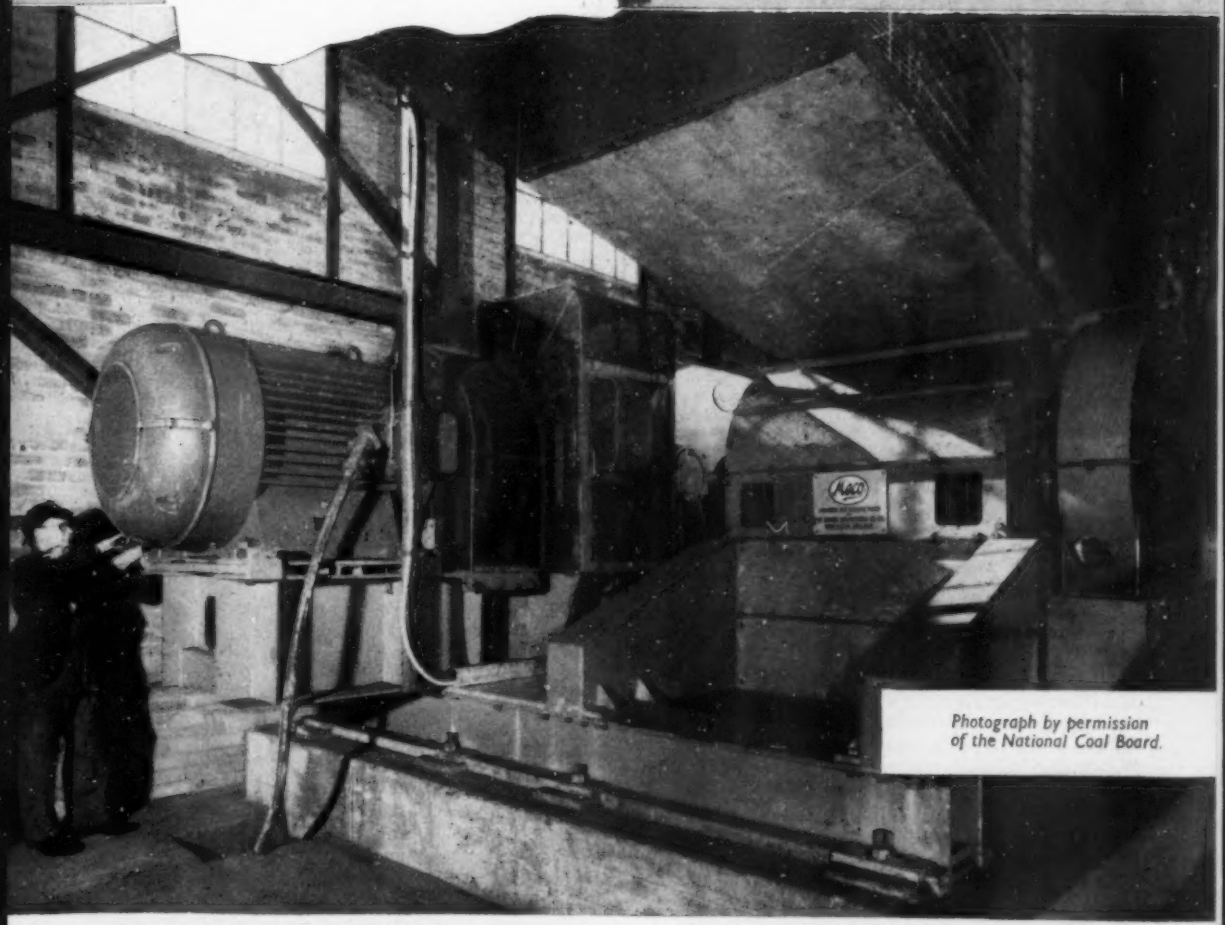
ERNEST NEWELL & COMPANY LTD.
MISTERTON VIA DONCASTER, ENGLAND.

Tel: MISTERTON 224 & 225.

The illustration shows a Meco single power pack coupled to a double drum belt conveyor driving head. The conveyor is 2,146 ft. long with a lift of 478 ft. and carries over 2,000 tons/day run-of-mine coal. The H.P. rating with the single power pack is 300 at 400 ft./min. MECO STANDARD POWER PACKS, SINGLY OR IN COMBINATION, CAN BE BUILT UP TO THE MAXIMUM POWER OF ANY AVAILABLE HIGH DUTY CONVEYOR BELTING.

Meco

MAXIMUM ECONOMY IN DRIFT TRANSPORT



Photograph by permission of the National Coal Board.

THE MINING ENGINEERING CO. LTD.,
MECO WORKS, WORCESTER, ENGLAND.

Telephone: Worcester 22291 (7 lines).
Telegrams: MECO Worcester.
London Office: 50 Pall Mall, London, S.W.1.
Telephone: Trafalgar 4686/7.
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L.P. 212—110

EUROPE'S LARGEST WALKING DRAGLINE...

RAPIER-built for faster mining of South Wales anthracite

This mammoth RapieR W.1800 walking dragline, now digging, lifting and dumping 60 tons of rock and earth a minute at the Glyn Neath workings of the National Coal Board, weighs 1800 tons and operates a 40 cu. yd. bucket from its 247-ft. boom. It is being used by contractors George Wimpey, stripping over-burden to expose beds of high quality anthracite 300 ft. below the surface.

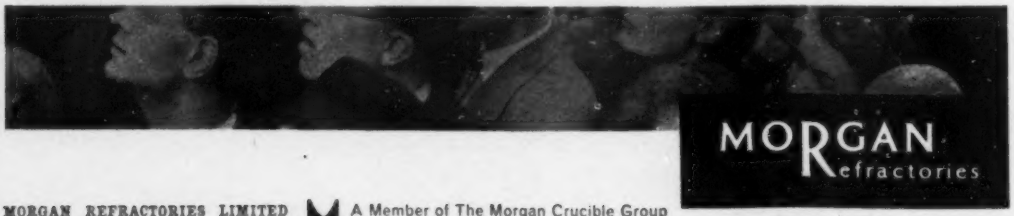
The machine was designed and built by Ransomes & Rapier, backed by the great engineering resources of the Newton Chambers Group of Companies. They are the only British organisation among the three or four in the world who produce excavating machinery of this size. RapieR walking draglines are at work from Australia to Scandinavia, from Africa to North America.

RANSOMES AND RAPIER LTD IPSWICH, ENGLAND

A member of the Newton Chambers Group of Companies

The "Queen Victoria" blast furnace at Appleby-Frodingham has produced 1,500,000 tons of iron—with the original MR2 stack lining. Operation continues.

United Steel's "Queen Victoria" blast furnace goes on beating records—month after month. In 1960 it became the first British blast furnace operating with 100% sinter burden to produce over 1 million tons of iron. The campaign has continued, and on September 24th, 1961 the output reached 1½ million tons—***with the stack lining of MR2 bricks, manufactured by MORGAN REFRACTORIES LIMITED still in excellent condition.*** Other relevant figures:—The campaign has lasted 177 weeks, during which period "Queen Victoria" has been charged with 3.87 million tons of sinter containing approx. 37% iron, 62,000 tons of scrap and 1.23 million tons of coke which represents 16.36 cwt. of coke per ton of iron. 26 cwt. of slag is tapped for each ton of metal produced, so the liquid throughput of the furnace has been 3.45 million tons.



MORGAN REFRACTORIES LIMITED
A Member of The Morgan Crucible Group
NESTON, WIRRAL, CHESHIRE. Telephone: Neston 1406

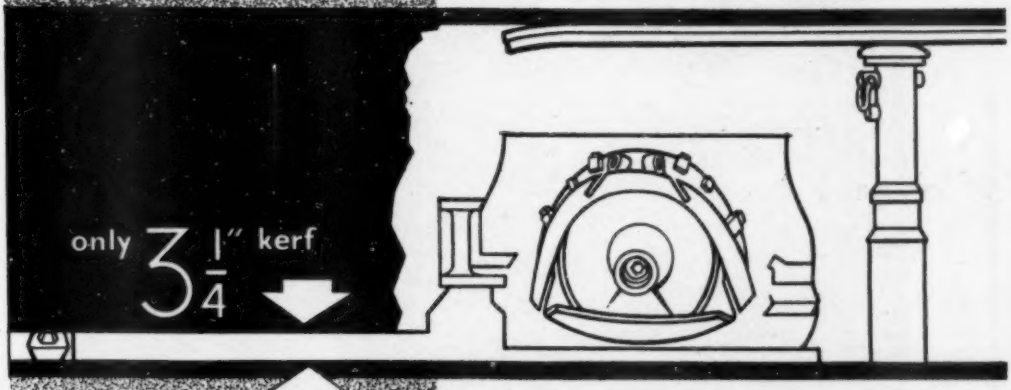
hoy

THIN KERF

coal-cutter chain units

for Thin-seam mining

- reduced kervings
- reduced power consumption
- increased large coal output
- increased face ventilation



HOY Thin Kerf chains are of the well-tried Multipic design and have ample strength for modern 80 h.p. machines but

they cut a kerf of only 3¼ ins.

In a thin seam this means a considerably smaller percentage of the coal is produced as kervings and a greater percentage as + 2" coal. The smaller gum pile improves ventilation.

■ ASK FOR NEW DESCRIPTIVE BROCHURE

AUSTIN HOY
AND COMPANY LIMITED
STATION WORKS • SAUNDERTON
HIGH WYCOMBE, BUCKS
Tel. NAPHILL 2353

TK2

...he's just brought himself
up to date with new trackwork
in his factory.
Sheffield firm did it...
Edgar Allen's

...I thought they
only made engineers' tools
and stuff like that!

ENGINEERS' TOOLS · TOOL STEELS · RAILWAY & TRAMWAY TRACKWORK
PERMANENT MAGNETS · STEEL CASTINGS · CEMENT PLANT · CRUSHING
GRINDING AND DRYING MACHINERY · DUST COLLECTION PLANT

EDGAR ALLEN & CO. LIMITED
STEELMAKERS AND ENGINEERS · SHEFFIELD 9

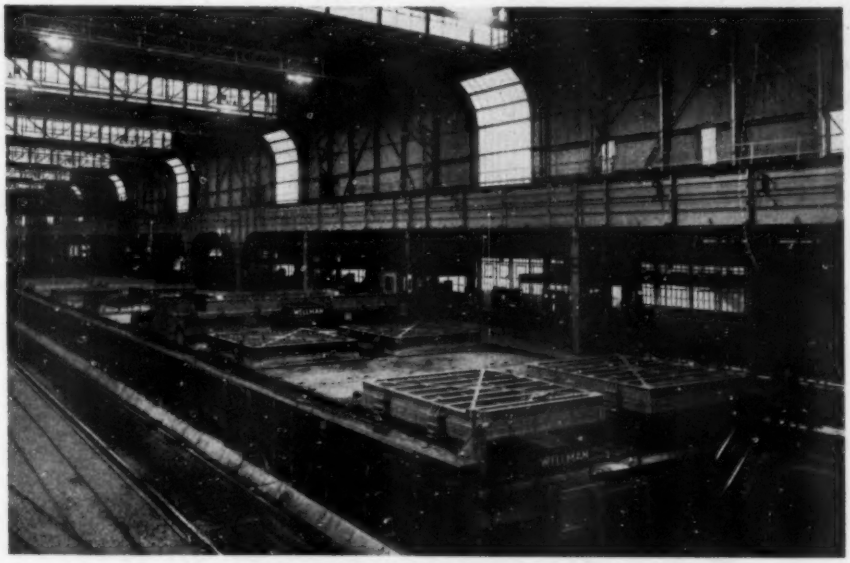
Wellman Soaking Pits

at the Abbey Works of

The Steel Company of Wales Limited

Initial installation — 20 Pits

Repeat orders have been received increasing this installation to 38 Pits — the largest battery of Soaking Pits in Europe.



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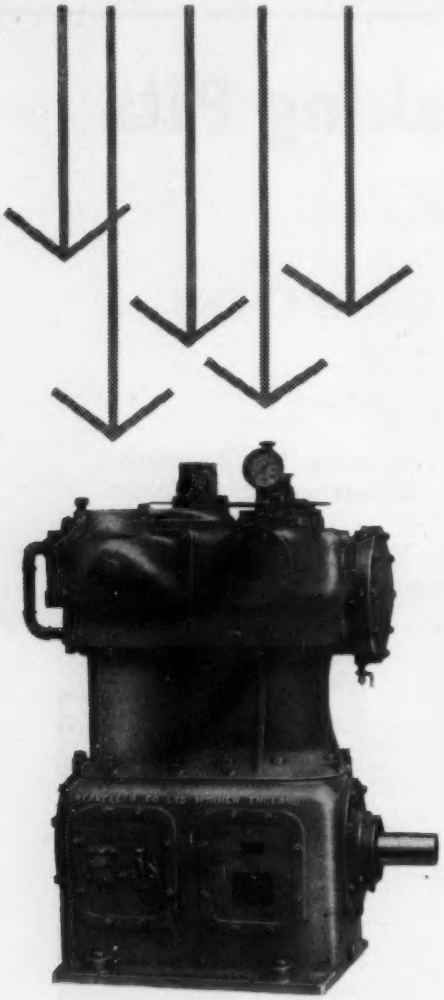

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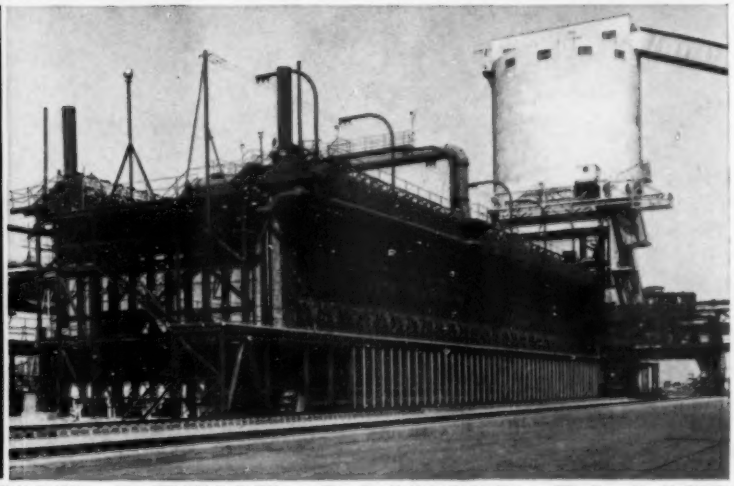

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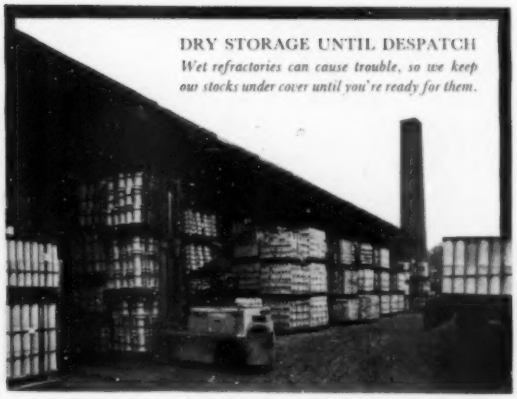
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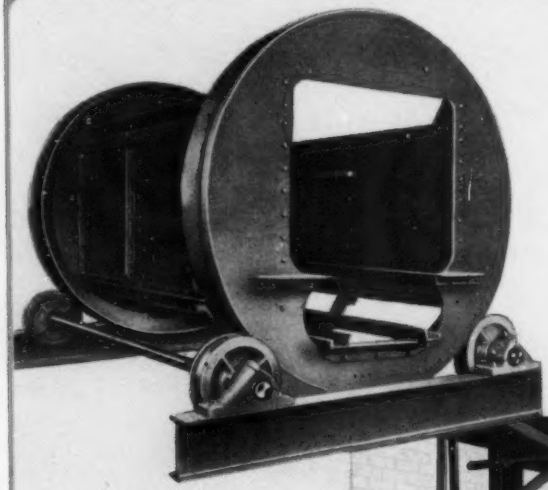

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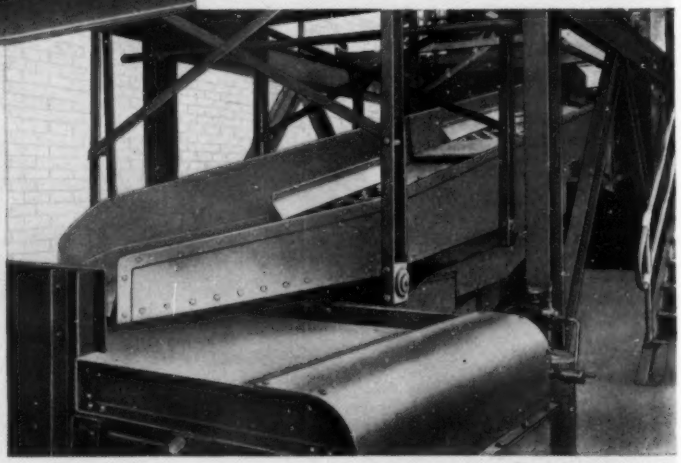

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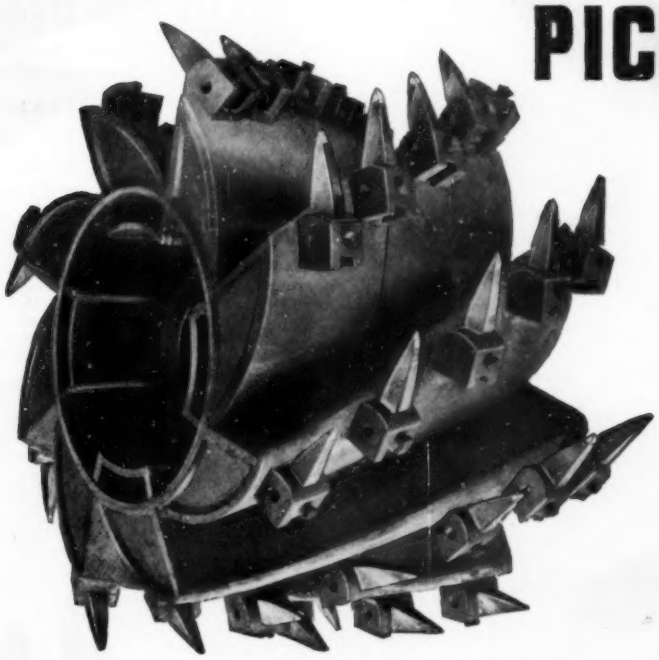

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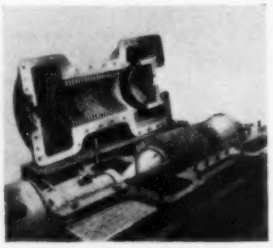

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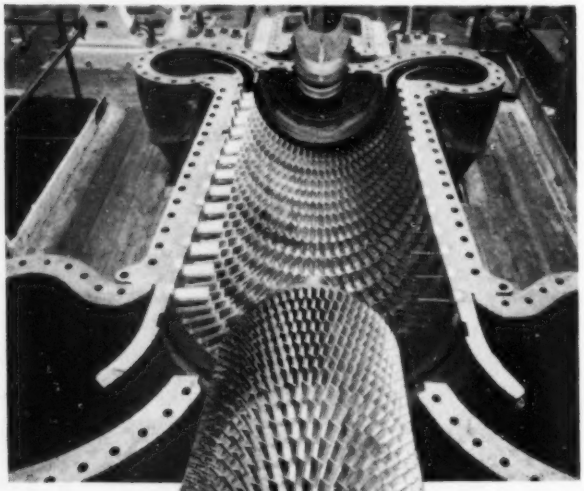

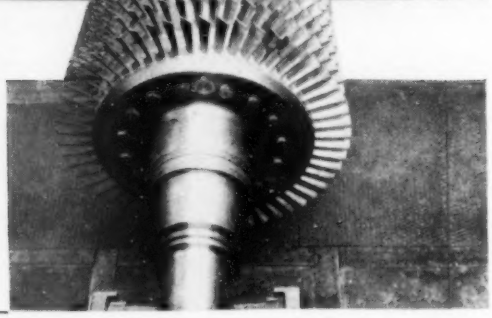

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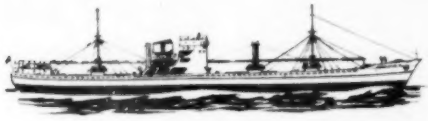

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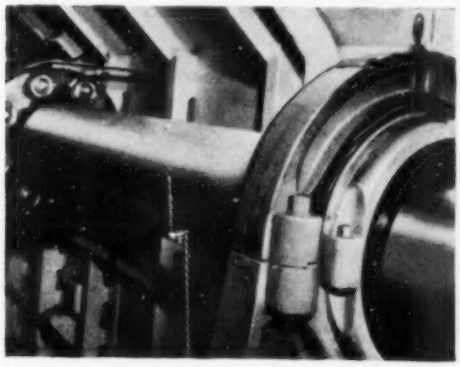

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Vol. 183
No. 4866

IRON & COAL
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OCTOBER 20, 1961

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IRON & COAL
THE IRON AND COAL TRADES REVIEW

Vol. 183 October 20, 1961 No. 4,866

Slackness in Steel

THE steel industry exists to serve its customers, and some of the many manufacturers to whom steel is a raw material find that trade has fallen off in recent months. They need rather less steel to fulfil orders for their products and seem to feel that they may require even less in the near future. Businessmen generally are not so optimistic about their prospects as they were four months ago, according to the latest survey made by the Federation of British Industries. Costs have tended to rise, profits have tended to fall, and many more businesses have been working below full capacity. Order-books both for the home and export markets have shortened since June and are expected to get shorter still. Lack of orders has now replaced shortage of skilled labour as the chief factor holding back production.

This lack of optimism is being reflected in steel order-books disproportionately to the thinning of the flow of business to steel users. Much of the falling off in the steel trade is due to the reversal of the 1960 stock increase which has taken place this year. When the steel industry is booming consumers tend to overbuy—to safeguard their supplies and also to discount the possibility of a price increase. In the initial stages of a slowing down of the steel trade, consumers generally keep up their stocks, but curtail their buying. Stock reduction starts at a later period of the decline, when little prospect of an immediate upswing is seen. This year the reduction of stocks seems to have started earlier and to have been more extensive than on other occasions when steel has been traversing a trough in the trade cycle.

The reasons are not far to seek. Steel is no longer in short supply, and consumers see no likelihood of shortages occurring for some time to come. They look to the immediate future in the knowledge that the Government has deliberately sought to restrain consumption in some sectors of the economy, and, apart from any effect that the credit squeeze may have had on the fortunes of individual steel consumers, it has certainly made the stocking of steel an expensive matter. Rising costs of steel production may have dictated caution to some consumers in the running down of stocks, for costs have to be recouped, but most users seem to have put from their minds any possibility of an increase in steel prices, and in adopting this attitude have no doubt felt themselves fortified by Government policy, which aims for restraint both in wage claims and in pricing. Consumers are aware, also, that British steel manufacturers are not alone in their experience, for the steel industries of Europe and America are also in hesitant mood. They may review the stock position when the trade barometer starts to rise again, but so long as their own profit margins are squeezed and high interest rates have to be paid they will not be anxious to carry larger stocks than are necessary for the efficient running of their works. Whether stocks are acquired on borrowed money or merely represent capital locked up they are expensive to hold at today's prices and current interest rates.

It may be that we have reached the stage where consumers have formed new ideas about stocks. Keeping reserves of raw materials at a high level is largely a post-war phenomenon, and users may adopt permanently a lower ratio of stocks to consumption than has been customary in the past. Such a decision could be awkward if it were implemented during a lengthy period of slack trade, but once the practice was established and accepted the industry would no doubt settle down to the new policy. Changes in consumption would then be more quickly reflected in steel manufacturers' order-books, and the mills would be relieved of the embarrassment of pressure from consumers to fill orders for steel which were not urgently needed, but were placed for stock maintenance purposes. In times of boom some of the pressure for deliveries is artificial.

There is no doubt, however, of the value of stocks to the industry as a whole. They serve as a cushion in periods of peak demand which is of benefit to producers, and they help the user who strikes a dull patch to curtail his financial outgoings without loss of production. Inevitably, too, if consumers decide in future to revise their ideas on the correct stock ratio some part of the burden of carrying stocks will be transferred to manufacturers, raising questions of storage space which are difficult enough already. It may be noted that the National Coal Board has adopted as a matter of definite policy the procedure of sending away from the pits as much of the output as it can persuade merchants and consumers to hold, in the interests of better distribution and improved organization at the producing end and in the belief that the best place for stocks in on the consumers' premises. One answer to the problem in steel is for the consumer to make more use of the services of the stockholder.

Actual usage of steel has held up better than

the production statistics suggest, but there has been a decline, and a reversal of the trend this year seems unlikely. The Iron and Steel Board has recently pointed out that motor vehicle producers have become the largest single consumers of steel in the United Kingdom, making the industry's prospects of great importance in estimating future steel demand. The car industry is having a thin time at present and production falls substantially short of expectations. The motor manufacturers have geared their works to meet a steady expansion of sales in the years to come. Before they can go ahead with their plans they have labour problems to solve, as the troubles at Ford's Dagenham works and the distressing happenings at the Rootes establishments so clearly demonstrate. No sector of the economy has been so disturbed by wildcat strikes as the motor-car industry, and they will have to stop if the industry is to make the progress it expects and the steel trade is to share in its prosperity. Although the strikes are unofficial, the unions have not been as co-operative as the employers and nation are entitled to expect. They have an effective sanction to hand in the form of expulsion to bring the culprits to heel, but so far have been curiously reluctant to apply it. The trouble at the Steel Company of Wales is in a different category, though no less disturbing, and in its own way a distressing symbol of the times. Organized labour and the individual worker must be brought to accept that wages and the standard of living depend on efficient production, and that prosperity can only be achieved by co-operation on the factory floor. Employers and employees are partners, each dependent on the other, and the nation dependent on both. There is more than a suspicion that in some sections of the car industry there is not only failure to co-operate, but an intention by extremist elements to sabotage the economy of the industry.

The credit squeeze has affected other makers of consumer goods besides the car manufacturers, and the results are likely to be increasingly felt by the steel industry before things generally take a turn for the better. When trade is flowing freely again the steelmakers will still have to match prices and quality with the achievements of manufacturers in other countries. That so far they have managed to do, and there is no reason to doubt their ability to continue to compete in world markets. But competition from other products—plastics, glass, timber, and the non-ferrous metals among them—grows steadily, and the steel industry must look increasingly to new uses for steel as well as the expansion of existing channels of consumption to find outlets for the larger tonnages which the planned expansions of producing capacity will bring on to the markets.

Passing Thoughts . . .

BRITAIN must not be left behind. It is inconceivable that our country, with its traditions of pioneering and discovery in every field, and its magnificent resources of men and intellectual power, should be constrained by our own inactivity to wait for other countries to impart to us the knowledge they have gained.—SIR WINSTON CHURCHILL, in a message read at the foundation-stone laying ceremony of Churchill College, Cambridge.

Good management depends . . . not on a synthesis of knowledge however useful but, like statesmanship, on a balance of character and intelligence.—Letter in The Times.

Promotion has become the only real measure of success in the modern firm. A man who is not considered to have the "potential" for promotion is looked upon as a failure, and to have reached "the ceiling" means to be condemned to a "permanent cessation of any meaningful rewards."—PROF. D. MCGREGOR, School of Industrial Management, Massachusetts Institute of Technology, speaking at a British Institute of Management conference in London last week.

British engineering is good and solid, but unfortunately British engineers are poor psychologists. They do not study the customer enough.—SIR HENRY SPURRIER, *chairman and managing director of Leylands Motors, Limited.*

The excessive load which an understaffed [factories] inspectorate is called upon to bear is bound to place a serious limit on the effectiveness of its work in the field of industrial safety.—Man and Metal, the journal of the Iron and Steel Trades Confederation.

If these nails were offered for sale to souvenir hunters at 1s. each, a substantial fund might be raised to help archeological research.—Letter in The Times referring to the discovery of several tons of Roman nails.

We know a good deal about classification, diagnosis, and treatment of misfit conditions, and it is damnable that facilities for tackling them should be so meagre in our welfare state.—PROF. ALEC RODGER, Professor of Occupational Psychology, London University.

Film Record of New Spencer Steelworks

FILM record of the building of the Spencer Steelworks at Llanwern, near Newport (Mon), is being made and the first of five reels showing developments from the original farmhouse was shown on Thursday of last week to members of the Usk River Board, who were guests of Richard Thomas & Baldwins, Limited, on a tour of the works site.

The board heard how the firm, in order to assist water conservation efforts, plans to re-use water to the fullest possible extent, and saw how powerful electric pumps, which can cope with 100,000 gallons of water a minute, deal with surface water drainage from the steelworks.

THE ACQUISITION of Star, the Italian electrical power tools company, by Black & Decker, Limited, has been completed. The new board of Star Utensili Electrici S.p.a. is headed by Mr. R. Appleby, who takes over this office in addition to his present duties.

Steel Exports

WELL ABOVE 1959 PEAK LEVELS

ALTHOUGH new export business is difficult to secure, current export deliveries are being maintained at a rate greater than in 1960, the Iron and Steel Board states in its monthly production report. Imports of most types of steel are continuing to fall as commitments come to an end. Imports during August included 6,000 tons of hot-rolled coil received from the USSR for rolling into sheet and re-export.

Net exports (the difference between exports and imports) of steel are, the Board states, being maintained well above the previous best figures reached in 1959. In 1937-38 the monthly average amounted to 53,000 tons (exports 135,000 tons); by 1955, the figure had risen to 93,000 (153,000) tons and, although exports increased to 198,000 tons in 1956, almost double the amount of steel imported (116,000 tons), pulled the net figure down to 82,000 tons.

The picture was reversed the following year when exports rose and imports dropped, giving a net figure of 173,000 tons. This has risen to a net export rate of 223,000 tons for the first eight months of this year.

Exports by Products

The annual rate of the export of plates has risen since 1957 (206,000 tons), to 405,000 tons this year, and a similar rise (193,000—369,000 tons) occurred in exports of heavy sections. Tinplate exports have dropped from last year's peak of 507,000 tons to 454,000 tons, and sheet, which has recovered from last year's low figure of 385,000 tons to 501,000 tons, is still below the 1957 figure of 528,000 tons.

Tube exports have declined steadily from 634,000 tons to 526,000 tons; light sections and bars, after a drop to 248,000 tons in 1959, have recovered to 327,000 tons. After slumps in exports of wire rod, strip, and railway material in 1959, these items have now climbed back to 65,000, 117,000, and 202,000 tons, respectively. The greatest fluctuation is shown in exports of billets—in 1957, 12,000 tons, 1959, 84,000 tons, 1960, 27,000 tons, and at an annual rate for the first eight months of 1961, 116,000 tons.

There was a great variation in the drop in steel production in September according to district. The greatest fall was in Derbyshire, Leicestershire, Nottinghamshire, Northamptonshire, and Essex (27.6 per cent.), the North-east Coast and South Wales and Monmouthshire both recorded falls of about 20 per cent., Scotland was 18.4 per cent. down, Sheffield, 17 per cent., and the other districts 10 per cent. or less. A similar falling-off in pig-iron production was recorded, with the exception of South Wales which was up by 8 per cent. Sheffield was 33 per cent. down, the North-east Coast 26.4 per cent., Derbyshire, etc., 23 per cent., Staffordshire, etc., 22 per cent., Scotland 19.2 per cent., North-west Coast 17.3 per cent., Lincolnshire 14.5 per cent., and Lancashire (except North-west Coast), 3.4 per cent.

Commenting on the motor industry, the board states that in recent years the production of motor vehicles has become the largest single consumer of steel in the UK. In the recently published Economic Review, the National Institute of Economic and Social Research forecasts that the production of motor-cars will reach 1,600,000 units in 1965, an estimate closely similar to the 1,560,000 estimated by the Board in its special report published in April. However, in assessing future steel capacity needs the board allowed for a car production substantially above this figure and it is pointed out that the board's calculations were carried out over a year ago, before the impact of the present recession in the motor industry and before consideration of the entry of the UK into the Common Market had reached its present active stage.

SCOW Peace Negotiators Try Again

FOLLOWING protracted discussion between the Amalgamated Union of Building Trade Workers and the Steel Company of Wales, Limited, on Tuesday, when it was stated that deadlock had been reached, the company management is to meet representatives of trade unions and full-time officials today (Friday). The bricklayers' strike has put 15,000 out of work at the company's Port Talbot works.

It is understood that on Tuesday agreement was reached on hours and wages but the talks foundered on "recuperation." The union maintained that after the bricklayers have been working for any length of time relining furnaces in intense heat they should be allowed to go home to recuperate. The management offered "cooling-off" time, but could not agree to the men leaving the works.

When the House of Commons met after the summer recess on Tuesday the Minister of Labour, Mr. John Hare, gave a résumé of the situation and said he was fully aware of the serious effects of the closure. Ministry officers had been in close touch with both parties since September 13.

New Appointments at Ebbw Vale Works of RTB

AMONG a number of new appointments at the Ebbw Vale Works of Richard Thomas & Baldwins, Limited, Mr. I. C. Gwynne who was appointed assistant general manager (production) in March, 1960, becomes assistant general manager of the Ebbw Vale section. Mr. W. D. Jenkins, production manager, rolling mills, has been appointed works manager.

Dr. G. R. Parkes, manager, tinplate department, moves to manager, cold rolling and finishing, sheet, and tinplate departments and Mr. D. F. Thomson, at present departmental manager, tinplate cold mill, succeeds Dr. Parkes.

Board Changes

New Director for Arthur Balfour

AN appointment to the board of ARTHUR BALFOUR & COMPANY, LIMITED, high-speed tool steel-workers, of Sheffield, is that of Maj.-Gen. E. P. Readman. Mr. Mark R. Balfour, a director of the company, has been appointed to the boards of Darwins Group, Limited, and its subsidiaries.

Mr. J. E. Robinson, formerly secretary of the group and subsidiaries, has been appointed secretary of Balfour and Darwins. Mr. D. Walker, formerly assistant secretary of Darwins group and subsidiaries, has been appointed secretary of the group and subsidiaries.

WALMSLEY (BURY) GROUP, LIMITED—Mr. John W. Hatch has been appointed a director.

NEW CONVEYOR COMPANY, LIMITED—Mr. J. D. Dunlop has been appointed managing director.

NEEPSEND STEEL & TOOL CORPORATION, LIMITED—Mr. S. G. Meggitt has resigned from the board.

BRAITHWAITE & COMPANY, STRUCTURAL, LIMITED—Mr. W. H. Diamond has been appointed to the board.

W. TYZACK, SONS & TURNER, LIMITED—Mr. J. B. Flanaghan, sales manager, has been appointed to the board.

JAS. SCOTT & COMPANY (ELECTRICAL ENGINEERS), LIMITED—Mr. A. B. Brown has been appointed a director.

JOHN BLACKWOOD, HODGE & COMPANY, LIMITED—Mr. A. R. Barker, sales manager since 1957, has been appointed to the board.

W. H. ALLEN SONS & COMPANY, LIMITED—Mr. W. A. Train, works manager, and Mr. F. J. Goodall, chief accountant, have been appointed to the board.

LIMMER & TRINIDAD LAKE ASPHALT COMPANY, LIMITED—Mr. J. P. McDonagh has resigned from the board because of his other business activities.

HIGH PRECISION EQUIPMENT, LIMITED—Mr. C. G. Moira and Mr. M. G. Nix have been appointed directors. Mr. J. E. L. Robinson has resigned from the board.

D. NAPIER & SON, LIMITED—Mr. G. Nelson has been appointed chairman of the company, a subsidiary of the English Electric Company, Limited. Mr. G. A. Riddell has been appointed a director and becomes deputy chairman, and Mr. P. J. Daglish becomes managing director to succeed Mr. H. E. C. de Chassiron, who has resigned from the position, but who retains his directorship. Lord Nelson of Stafford, Sir John Paget, Sir Archibald Hope, and Mr. A. J. Penn have resigned from the Napier board.

GLOVER & MAIN, LIMITED—Mr. Vernon Stott, managing director of Jas. Stott & Company (Engineers), Limited, a subsidiary, has been elected to the board.

FOSTER TRANSFORMERS, LIMITED—Mr. H. E. Levy, chief engineeer, has been appointed to the board of the company, which is in the Metal Industries, Limited, group.

THOS. & JNO. BROCKLEBANK, LIMITED—Mr. J. Abell and Mr. H. B. Cowley have been appointed to the board. They will continue as chief accountant and deputy general manager respectively.

HENRY BALFOUR & COMPANY, LIMITED—Mr. W. Lindsay Burns has relinquished his executive duties with the group, but remains as a director and chairman of the board and also in a consultative capacity.

P. P. PAYNE & SONS, LIMITED—Mr. L. R. Crawley has been appointed full executive director, and Mr. O. C. I. Spicer, company secretary, becomes an alternate director to Mr. A. E. Smith, deputy chairman.

BLACK & DECKER, LIMITED—Mr. J. C. Brooman has been appointed export sales director and Mr. E. A. King financial director. Mr. J. H. Longland becomes sales manager in the UK and Mr. R. K. Symmons, marketing manager.

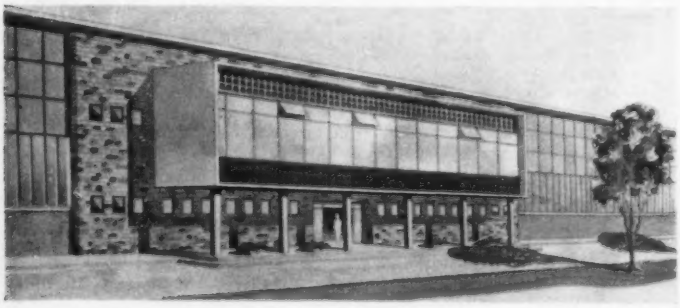
SUBMARINE CABLES, LIMITED—Mr. C. L. G. Fairfield, commercial director, Mr. G. H. Foot, chief engineer, and Mr. S. J. Wilson, works director, have been appointed executive directors and Mr. D. T. Hollingsworth has been appointed to the board.

DAVIDSON & COMPANY, LIMITED—Mr. C. E. H. Eckersley has relinquished his executive duties as sales director, but continues as a member of the board and in a consultative capacity. Mr. W. R. Magowan, general sales manager, has been appointed sales director.

JOHN RIGBY & SONS, LIMITED—Mr. Walter Wright, financial director and secretary since 1942, has been appointed chairman in succession to the late Mr. Harold W. Rigby. Mr. John Rigby continues as managing director and Mr. A. S. Parr, director, takes over as secretary from Mr. Wright.

CASTROL, LIMITED—Mr. L. Colkett, Mr. K. C. McCarthy, and Mr. G. H. Thornley have been appointed to the board. Mr. Colkett is secretary of Castrol. Mr. McCarthy is to become general manager of the Castrol division on January 1 next, and Mr. Thornley has been group technical manager since 1951.

STAINLESS STEEL CURTAIN WALLING FOR SAMUEL FOX & COMPANY



STAINLESS steel curtain walling is to be adopted for the main façade of the new wire department of Samuel Fox & Company, Limited, branch of the United Steel Companies, Limited. The existing department is on a congested site at the Stocksbridge works which is required for billet mill extensions.

Illustrated is an architect's perspective of the administration block which will form part of the new building. Completion is expected early next year.

"FREE TRADE FOR FUEL"

British Coal Exporters' Case

DECISIONS by the Government on any current or forthcoming applications for the import of coal or methane should be deferred for some months—say until the spring of next year—is the contention of the British Coal Exporters' Federation in a well-argued case presented in a BCEF Coal Policy Study, "Free Trade for Fuel," published recently. The booklet balances fairly the "threat" of American imports of coal with the bargaining value of European imports under Common Market membership.

The BCEF states categorically that if the Government should decide on appreciable relaxation of present import controls, it ought at once to withdraw any surviving restrictions on the National Coal Board's freedom to price its own coals, subject to statutory obligations to avoid undue preference or advantage. The NCB for its part should extend its policy of taking a new look at the problems which it has to meet in the present half century.

Finally, the federation gives a thinly-veiled warning. Unless the NCB exploits its restricted flexibility in production—and hence, marketing—to the limit in order to meet and, if possible, to turn to its own advantage new elements in energy supply and changes in consumer techniques, mounting and dangerous tensions could build up between our short-term commercial advantage and our long-term economic security.

Clear Definition Needed

The federation calls for Government deferment of decisions on the valid (and highly probable) grounds that the political and economic scenery here and on the Continent can change in many important respects. What might be reasonable now could be quite unreasonable in 1962.

Until such decisions are made the BCEF feels that the Government should define clearly its future expectations of the coal industry. Assessment should be made of minimum capacity of the industry in main types of coal necessary to meet the demands the Government considers should, for economic, social, and political reasons, be borne by British coal.

It should assess the quantities of coal, oil, and natural gas likely to be imported if all controls were removed, taking into account the natural "growth factor" in national energy requirements—and this assessment should be interpreted in terms of cost in foreign currency.

It should investigate the limits of the physical facilities for importing coal and the influence of methane imports on coke availability and, hence, clean air. It should find out from the NCB to what extent the British coal industry would wish to import ECSC coal and what countervailing advantages could be looked for in the form of extra British coal exports.

It should settle its new financial policies for the nationalized coal industry and secure accurate operational costing of large-scale Lurgi projects. Finally, the likely consumption pattern of fuel imports on a freed market should be investigated and estimates made of how far any resulting production cost savings would be reflected in export prices, and hence in greater export competition for British industry. The likely benefit in extra foreign currency earnings should be compared with extra import costs.

In brief the federation feels—and many in industry and commerce will wholeheartedly agree—that the Government should brook no delay in getting a clear and statistically sound picture of the whole field of the country's energy requirements, the capabilities of the coal-mining industry, and the export value of the country's only indigenous fuel. This should be done in order to take full advantage of Common Market membership, afford every possible opportunity to British industry in its competitive struggle in that market by providing the cheapest and best possible energy supply, economically and politically, and to encourage and support the efforts the Coal Board is making to establish coal-mining on a long-term basis of efficiency and prosperity.

Output No Basis for Rating Valuation

IF the NCB's Smithy Wood coking plant at Ecclesfield, Sheffield, were to be assessed for rates on an output basis, then every iron and steel firm in Sheffield could ask for a reduction every year that production fell. This was stated at Sheffield Valuation Court last Friday, when the board failed in a claim that the plant should be assessed on an output basis.

Mr. Lawrence Tattershall, for the NCB, asking that the net annual value of £28,200 should be reduced to £26,000 and the rateable value cut accordingly, emphasized that the demand for coke had fallen. In 1956, he said, the North-Eastern Divisional Coal Board had 18 plants producing 2,790,701 tons; now there were seven plants and (in 1959) the output had fallen to 1,471,798 tons. The output of coke at Smithy Wood in 1956 was 269,547 tons, but in 1960, it had fallen to 219,823 tons. Based on present output a fair net annual value would be £26,000.

For the valuation officer, Mr. Trevor Elliott said he could not accept that Smithy Wood was the type of property which should be dealt with on an output basis. He said: "We do not have people coming to us from iron and steel firms saying production is down and they want a reduction. Production varies every year. Smithy Wood must be assessed on the basis of effective capital value."

Appointments

Controller of Education and Training for Vickers

MR. T. S. J. ANDERSON, who has been director of studies at the Royal Military Academy, Sandhurst, since July, 1948, and who was previously external registrar at London University, will join the staff of Vickers, Limited, on January 1, 1962, in the newly created appointment of controller of education and training.

This appointment carries the status of a principal officer of Vickers.

Mr. E. E. WEBSTER has been appointed general manager of the Swindon region of the Plessey Company, Limited. He joined Plessey in 1950 as chief inspector.

Mr. E. S. STOWE has relinquished his appointment as secretary of Triplex Holdings, Limited, and has been appointed treasurer and chief accountant. He is succeeded as secretary by Mr. A. A. J. HARMAN.

Mr. L. BARTON, Mr. A. B. CROMPTON, Mr. G. L. JAQUES and Mr. L. WINSTANLEY have been appointed assistant directors of Matthews & Yates, Limited, heating and ventilation engineers, etc., of Swinton (Lancs).

Formerly Scottish machinery manager for G. E. Simm (Machinery), Limited, Sheffield, Mr. J. J. MCGONIGLE has been appointed plant and machinery manager for Barnes & Bell, Limited, steel stockists, etc., of Glasgow.

Mr. NEVILLE ANDERSON has been appointed technical representative in South Wales, for Craven Electronics, Limited, Bingley (Yorks), a member of the Sutcliffe Engineering Industries group. He joins the company from Saml. Denison & Son, Limited, Leeds.

Mr. J. T. DAVENPORT has been appointed general manager of the foundry division of Sheepbridge Equipment, Limited, Chesterfield, a member of the Sheepbridge Engineering Group. Mr. W. MCLELLAND succeeds Mr. Davenport as foundry manager of Sheepbridge Alloy Castings, Limited, Sutton-in-Ashfield (Notts).

Assistant general sales manager of Ransomes & Rapier, Limited, Ipswich (Suffolk), since the beginning of last year, Mr. P. B. GORST now becomes general sales manager for all products except earth-moving equipment. Mr. L. L. Nash has been appointed executive assistant to the managing director. Since 1959 he has been personal assistant to the managing director.

Mr. K. B. HOGG, appointed general works manager of Electronic Instruments, Limited, Richmond (Surrey), held various positions with Ferranti, Limited, before becoming works manager of the Brimsdown works of Associated Electrical Industries, Limited, in 1957. He was promoted to general works manager with responsibility for the five southern group factories of AEI in 1958, an appointment he held until he joined Electronic Instruments.

Mr. ISLWYN THOMAS, a member of the executive council of the South Wales Area of the National Union of Mineworkers, has been appointed Area industrial relations officer in the No. 9 (Neath) Area, South Western Divisional Coal Board, in succession to Mr. D. R. Llewellyn recently-appointed deputy divisional industrial relations director. Mr. Thomas has for many years been chairman of Great Mountain Lodge, Tumble, near Llanelly.

Davy-United Primary Mill for Park Gate's New Steelworks

CONTRACT from the Park Gate Iron & Steel Company, Limited, to build a 42 in. by 104 in. reversing blooming mill, complete with a full range of auxiliary equipment, for the new integrated steelworks which Park Gate is now establishing on a new site on the outskirts of Rotherham, has been secured by Davy & United Engineering Company, Limited, a member of the Davy-Ashmore group. The value of the contract is approximately £1,000,000.

Park Gate's development project has as its initial aim the increasing of annual ingot capacity from 425,000 tons a year to 800,000 tons a year. The increased output of steel which the new plant will make possible is intended to help both the internal needs of the TI group, of which Park Gate is a member, in the production of steel tubes and other engineering products, as well as those of Park Gate's own customers.

The new Davy-United mill will be the primary rolling unit of the works and is being designed to roll ingots up to 5 tons in weight in carbon and rimming steels and certain low alloy steels. Driven by twin 3,000 h.p. motors, the mill will eventually supply blooms ranging from 5 in. by 5 in. to 14 in. by 14 in. square, to feed continuous billet, and narrow strip mills which Park Gate also proposes subsequently to instal, as well as the existing finishing mills.

BISF APPOINTMENTS

THE British Iron and Steel Federation announces the following appointments:—Mr. E. W. Senior, to be director of the federation. Mr. J. B. Cowper is to be managing director of British Iron and Steel Corporation, Limited—the industry's main central trading organization—in addition to his present post of financial director of the federation.

Mr. J. Driscoll becomes assistant director (economics); Mr. L. J. Gollop, assistant director (statistics); Mr. B. S. Keeling, assistant director (training); Mr. A. H. Mortimer, assistant director (commercial), and Mr. K. Donohue is to be secretary of the federation.

Appleby-Frodingham Steel Furnace Record

RECORD of 5,181 tons of ingots was produced by the "L" Ajax furnace in the Scunthorpe (Lincs) melting shop of the Appleby-Frodingham Steel Company, branch of the United Steel Companies, Limited, during the week ended September 30. This beat by 109 tons the previous best figure set up during the week ended January 21.

The furnace was converted to the Ajax process in June of last year and in that month it made a record of 4,047 tons. The latest record is the sixth best figure made since then. Before conversion the best amount produced by the furnace was 3,050 tons.

THE $6,500,000 Export-Import Bank loan to the Japan Steel & Tube Corporation will be signed in Washington on Tuesday. The loan will go towards the construction of the company's Mizue ironworks and for the purchase of a tinning mill from Wean Engineering, US.

ECE STEEL COMMITTEE

Priority for Two Inquiries

EXAMINATION of the provisional version of its annual review of short-term problems in the steel industry and trends in the market was made at the recent meeting in Geneva of the Steel Committee of the Economic Commission for Europe. Following the particularly high level of activity in most countries of the world in 1960, consumption and production of steel, which is now levelling off in western Europe, is being maintained at about the same rate as in recent years in eastern Europe. There was a fall in new orders from ECSC home markets, but the export market continues to show marked buoyancy.

The general shortening of delivery dates, which has been most marked in Britain in recent months, is common to the rest of western Europe, principally because of the moderating demand and the outstanding expansion of capacity in the industry which is now coming into operation.

The utilization of steelmaking capacity in the United States rose from about 50 per cent. in January, 1961, to 70 per cent. in May, and expected production of steel for 1961 is of the order of 90,000,000 tons. Consumption and production of steel in Japan continued to rise at the same remarkable rates as in the last two or three years.

Report on Steelmaking Processes

The committee considered the report comparing different steelmaking processes, the inquiry into the rise of steel in construction, and its long-term programme of work. It decided that after a further consultation with experts the study on economic and technical advantages of the different steelmaking processes should be published during the first half of 1962. It was also agreed that for its inquiry into use of steel in construction, the secretariat should be assisted by a group of expert rapporteurs on the technical aspects of steel as a building material. It is expected that a provisional version of this report will be examined by the committee at its next session in March, 1962.

It was also decided that priority should be given to the inquiry into the economic aspects of iron-ore preparation, to be followed by one into other measures to improve blast-furnace efficiency, and to the inquiry into long-term trends in the competitive use of steel in comparison with other materials.

FBI Executive Visits East Europe

HEAD of the East European section of the oversea directorate of the Federation of British Industries, Mr. E. S. Taylor is visiting Bulgaria, Hungary, and Rumania to study export opportunities for British industry and have talks with officials of the Ministries of Foreign Trade, State Planning Commissions, and major state buying enterprises. In particular he will inquire into possibilities of increasing exports of British capital equipment to these countries.

British exports to Bulgaria, Hungary, and Rumania are on the increase. In 1959, compared with 1960, exports to Bulgaria increased from £1,900,000 to £2,700,000, to Hungary £3,900,000 to £4,300,000, and to Rumania £1,500,000 to £3,000,000.

Plans to Cut Japanese Steel Investment

SEVEN leading Japanese steel manufacturers have been asked by their Government to cut by 5 per cent. their investment programmes in the current financial year (April to March) as well as to increase their exports. These measures have been taken because of the Japanese Government's policy of holding down capital outlays to reduce imports and prevent deterioration of the balance of payments position.

Existing plans for expanding productive capacity in the Japanese steel industry, which were announced by six leading producers early this year, envisage doubling output by 1965. Steel output last year was 22,143,000 tons, and it has been estimated that this year it might rise by as much as 20 per cent. to some 27,000,000 tons.

Meanwhile it is reported that nine Japanese ironsmelters have decided to join a scheme for developing iron-ore mines in the Republic of Guinea. The programme has been planned by the "Consafrique," a special group of banks of seven countries for the development of natural resources in Africa. Under the programme an international joint venture both at Nimba and Simandou mines would be established by the Guinean Government and Consafrique with help from ironsmelters of several other nations.

RISE IN EXPORT ORDERS FOR BRITISH MACHINE TOOLS

FURTHER rise in overseas orders for British machine tools again offset the effects of falling home demand during July, according to figures issued recently by the Machine Tool Trades Association. As a result there was a lengthening of the industry's order-book to £115,500,000, compared with £113,300,000 a month ago. New export orders received in July were worth £4,272,000—35 per cent. higher than in July last year, while new orders from British firms, worth £7,940,000, showed a drop of 26 per cent., compared with July last year.

Western Germany is ordering an increasing number of machine tools from Britain, and during the month moved into second place among the industry's foreign customers. Relatively better delivery dates are believed to be a major factor in the improvement in sales to Germany.

Personal

West Midlands NCB Area Management

FROM November 1, 1961, Mr. F. L. WHITE, Area general manager of the Cannock Chase Area of the West Midlands Division of the National Coal Board, will also be responsible for the division's South Staffordshire and Shropshire Area.

The Area will continue as a separate entity until consultations with the trade unions concerned are completed.

Mr. L. DOBSON of Newcastle-upon-Tyne has been installed chairman of the Institution of Structural Engineers Northern Counties branch.

Mr. G. L. BIBBY has been appointed Lecturer in the Department of Electrical Engineering, Leeds University, and Dr. A. E. D. HEYLEN will take up a similar post on January 1.

Mr. RODNEY BAILEY, a 19-year-old student at Leyland Motors, Limited, day continuation school, has been awarded the Bostock Award by the Union of Lancashire and Cheshire Institutes, for the highest marks in the National Certificate examination.

Sir BERTRAM WARING, chairman and managing director of Joseph Lucas (Industries), Limited, formally opened the Gracie Hall of Residence at the Birmingham College of Advanced Technology, on Monday.

Mr. P. RICHARDSON, deputy chief electrical engineer, C. A. Parsons & Company, Limited, Newcastle-upon-Tyne, has been installed chairman of the North-eastern Centre of the Institution of Electrical Engineers, in succession to Mr. D. H. Thomas of Rutherford College of Technology.

Manager of roll sales of Armstrong Whitworth (Metal Industries), Limited, Gateshead (Co. Durham), Mr. T. A. BIRD, starts a round-the-world sales tour through five countries today (Friday). He will return in early December after visiting rolling mills in Southern Rhodesia, South Africa, Australia, Mexico, and Canada.

The council of the Royal Institution of Naval Architects has awarded the Denny Scholarship in Marine Engineering (£350 per annum for four years at Glasgow University) to Mr. DAVID K. BROWN, of Kelvinside Academy, Glasgow. The Parsons Scholarship in Marine Engineering (£400 per annum for three years at Durham University (King's College, Newcastle-upon-Tyne) is awarded to Mr. ALAN B. TURNER, of Alfred Holt & Company, Limited, Liverpool.

Mr. E. N. GRIFFITH, chairman of Rotary Hoes, Limited, and past president of the Agricultural Engineers' Association, has been elected president of the British Engineers' Association, with Mr. K. M. LEACH, director of Serck, Limited, and past chairman of the British Valve Manufacturers' Association, vice-president. Mr. A. I. BAKER, chairman of Baker Perkins, Limited, and the immediate past president of BEA, becomes honorary treasurer.

APPOINTMENT IS ANNOUNCED of Wessex Machine Tools, Limited, Bath, a member of the Bath & Portland Stone Firms, Limited, group, as European manufacturing licensees for Ty-Sa-Man Machine, of Knoxville, Tennessee. The Bath company will manufacture the entire range of Ty-Sa-Man designs, comprising large plate saws for non-ferrous metals and stainless steel, billet and slab grinders for stainless steel, and friction and abrasive saws for structural and alloy steels.

Memorial Service to Sir Ellis Hunter

MANY of the leading people in Britain's iron and steel industry were present at St. Margaret's Church, Westminster, on Tuesday for a memorial service to Sir Ellis Hunter, chairman of Dorman, Long & Company, Limited, and its principal subsidiaries and president of the British Iron and Steel Federation from 1945 to 1953, who died on September 21.

The service was conducted by Canon Michael Stancliffe. Among representatives of Dorman, Long were Mr. E. T. Judge (chairman), Sir Toby Low, MP, Mr. Eric Towler, Mr. W. L. Fletcher, Mr. E. N. Highton, Mr. G. Chicken, Mr. C. Hipwell, Mr. A. Macleod, Mr. J. P. Pain, and Mr. E. K. Scott (directors); and the British Iron and Steel Federation was represented by Mr. C. R. Wheeler (president), Sir Ronald Morison, QC (independent chairman), Mr. E. W. Senior (director), Mr. B. Cowper (finance director), and Mr. J. Driscoll (secretary), principals, and members of the staff.

Concern in Ebbw Vale Over Steelworks' Future

AT a meeting of Ebbw Vale (Mon), Trades Council, it was stated that concern was growing in the town over the future of the steelworks of Richard Thomas & Baldwins, Limited, which employs 10,000 local people.

A deputation from the trades council and local union leaders discussed the matter with Mr. Michael Foot, MP for Ebbw Vale, at a meeting last Friday, when it was decided to take up the matter with Mr. Henry F. Spencer, the managing director of RTB, and to ask the Iron and Steel Board to meet a deputation which would include Mr. Foot.

The "Curse" of Executive Life

ONE of the curses of executive life, according to a detailed survey conducted by Dr. George Copeland, is that the managing director must spend three quarters of his working life communicating with other people. This meant continuous interruptions and it was hardly surprising that so many business executives became frustrated and felt they got nothing done. The survey is published in the current edition of the magazine Business.

From his analysis of statistics given by 58 executives, Dr. Copeland concludes that the man who becomes more efficient at communications can spend more time on creative work; that the realization of the amount of time taken up on communications and the decision to work long hours, could mean an added amount of creative work; and that executives should be trained in decision-taking.

PRESTWICH PARKER, LIMITED, manufacturers of bolts, nuts, rivets, etc., of Atherton (Lancs)—The directors expect to be able to recommend dividends of not less than 12 per cent. on capital proposed to be doubled by a scrip issue, for the year to June 30, 1962. This would compare with the 1960-61 equivalent of 11½ per cent. Current trading is stated to be continuing at the level of the previous year.

Obituary

MR. H. J. PERRINS

Loss to Mines Inspectorate

THE death took place last week at Doncaster of Mr. Harry Joseph Perrins, HM Divisional Inspector of Mines and Quarries, North-Eastern Division, Ministry of Power, and chairman of the Divisional Dust Prevention Committee of the Ministry, and a member of a number of committees dealing with safety and health in mines. Mr. Perrins, who was 54, played a prominent part in the rescue and recovery operations at Weetslade Colliery (Northumberland) in 1952 when, as the result of an explosion, five men lost their lives.

Mr. Perrins began his mining career at the age of 15 when he started work in a Derbyshire mine. He studied mining at Chesterfield Technical College and obtained a first-class certificate of competency as a colliery manager. He later became an undermanager and also taught at Clowne Mining Technical College. In 1937 he was appointed manager of Bickershaw Colliery (Lancs), and two years later became HM Inspector of Mines in West Scotland.

Promotion to senior inspector was followed by transfer to the Northern Division where Mr. Perrins became Senior District Inspector in charge of the Northumberland District. In the same capacity he went to the South Durham District in 1952 and while there was made OBE in the 1956 New Year Honours.

He was promoted Divisional Inspector in the North-Eastern Division in June, 1958. He was a member of the council of the Midland Institute of Mining Engineers and a member of Yorkshire branch of the National Association of Colliery Managers. He made several contributions to mining literature, dealing with roof control, water dangers, and the incidence of inflammable gas in mines. Four of his papers have been published in the Transactions of the Institute of Mining Engineers, the best known being that dealing with inflammable gas in the Cleveland ironstone mines.

VISCOUNT CROOKSHANK

A PERIOD of four years from 1935 during which Viscount Crookshank (who died in London on Tuesday at the age of 68) served as Secretary for Mines was an eventful and difficult time for the coal industry. A national coal strike was narrowly averted while Capt. Harry Crookshank (as he then was) was in charge at the Mines Department of the Board of Trade. His tenure of office witnessed the establishment of the National Joint Consultative Committee and an all-round improvement in relations in the industry. Introduction of the colliery district selling schemes was a further notable measure achieved under his guidance. His ideas on that subject were outlined to members of the Coal Industry Society in 1936, when he addressed them on "Central Selling in the Coal Industry."

His active association with the industry ended in 1939 on his appointment as Financial Secretary to the Treasury, but friendships made while he was Secretary for Mines continued down the years. In 1958, in fact, he accepted an invitation to serve as president of the Coal Trade Benevolent Association.

Viscount Crookshank sat in the House of Commons as Conservative member for Gainsborough for 32 years, from 1924 to 1956. He was Leader of the House of Commons between 1951 and 1955 and a former Minister of Health and Lord Privy Seal. Other offices were entrusted to him in his long career, during which he developed a mastery of parliamentary procedure.

MR. CHRISTOPHER COATES

THE death has taken place at the age of 74 of Mr. Christopher Coates, Grendon, near Atherstone (Warwickshire), until his retirement in 1952 undermanager at Birch Coppice Colliery, Tamworth. He was a member of a well-known mining family, his father and elder brother both being colliery officials in North Staffordshire.

Mr. Coates' early years as a junior official were spent at Norton Colliery, Stoke-on-Trent, and he was appointed undermanager at Birch Coppice in 1925. When he retired he had completed over 53 years in the mining industry. He had, for very many years, been a member of the National Association of Colliery Managers.

Mr. JAMES SUTHERLAND, who has died at the age of 93, after two years' illness, retired in 1935 as office manager of the Lanarkshire Steel Company, Limited. He had been a member of the staff for 43 years.

The death has occurred at the age of 60 of Mr. FRANCIS JOSEPH SMITH, chief mechanical engineer since 1959 with Herbert Morris, Limited, manufacturers, of lifting and transporting machinery, of Loughborough (Leics). He started work in the firm's drawing office in 1915 and was appointed chief draughtsman in 1946.

One of the "Old Contemptibles" who took part in the retreat from Mons in 1914 died on Saturday. He was Mr. STEPHEN DAVIS, checkweighman at South Kirkby Colliery, near Pontefract (Yorks). Mr. Davis, who was 70, was awarded the Croix de Guerre. For the past 30 years he had played a prominent part in local government.

The death took place on Saturday of Mr. WILLIAM PAULIN STOTT, a director of Smith & Wellstood, Limited, ironfounders and makers of stove and range equipment, etc., of Bonnybridge (Stirlingshire). He

was 66. Mr. Stott, who had spent most of his working life with the firm, was manager of its Glasgow office and became a director several years ago.

The death has occurred of Mr. WILLIAM E. DOUGHERTY, secretary of the Scottish branch of the National Union of Manufacturers since its formation 12 years ago. Mr. Dougherty, who was also responsible for the union's Northern Ireland branch, was previously on the staff of W. & T. Avery, Limited.

Director and general works manager of Midlands Tar Distillers, Limited, Oldbury (Worcs), Mr. WILFRED FRANK DINES has died at the age of 59. He went to India in 1929 to work for Angelos Bros., Limited, Calcutta, relinquishing his post as area manager in 1945 to become managing director of Shellac Industries, Limited, Calcutta. Returning to the UK in 1949, he joined Midland Tar Distillers and was responsible for the design and building of the company's refinery at Four Ashes (Staffs). On its completion in 1953 he became refinery manager, joining the board in 1960.

Mining Not a "Dying Industry" in Fife

"I WOULD assure you that mining in East Fife is anything but a dying industry and that there is going to be coal mined for a long time to come," said Mr. John Sim, agent-manager at Wellesley Colliery, speaking in Methill on Thursday of last week. In Wellesley Colliery there was still a considerable amount of coal, despite the rather negative information supplied by off-shore borings and from underground bores and in Michael and Frances collieries there were tremendous reserves.

In all these cases, he went on, mining engineers would have to meet the challenge of winning coal economically from far out under the sea and would also need to maintain the drive on mechanization, not only at the coal face, but all the other ancillary operations.

At the new Seafield Colliery, Kirkcaldy, there were vast reserves in both productive and limestone groups. Mr. Sim said it was inevitable that the smaller reserves in other pits would be worked out, but there was ample capacity elsewhere in the area providing they could get the coal economically from the pits.

European Record for a 3ft. Seam?

IN the week ended October 7 miners on Swallow Wood 9's face at Barrow Colliery, near Barnsley, won an average face output per manshift of 22.53 tons. The face is mechanically cut and loaded by an Anderton shearer loader continuously throughout the 24 hours of the day. The machine cuts into the coal at a depth of 2 ft. 3 in. on each shear. During the week 45 shears were taken off the face and they yielded some 8,000 tons of coal.

This is considered to be a productivity record for any 3-ft. seam in Britain and may well be a European record for a comparable seam thickness.

NEWSTEAD COLLIERY (Notts), produced 27,341 tons of coal last week, exceeding its weekly record by more than 2,000 tons.

Mechanization in Coal Mining

MECHANIZATION programme, which was being so energetically pursued by Lord Robens, chairman of the National Coal Board, was responsible for much of the recent success and the renewed optimism in the coal-mining industry, said Mr. James Anderson, chairman and managing director of Anderson, Boyes & Company, Limited, mining machinery manufacturers, of Motherwell, and president of the Association of Mining Electrical and Mechanical Engineers.

MR. J. ANDERSON

He was replying to the toast of the association proposed by Mr. R. W. Parker, chairman of the Scottish Divisional Coal Board, at the annual dinner of the West of Scotland branch of the association. By about 1965, he said, almost all the coal in this country would be produced by mechanical means. This presented a powerful challenge to AMEME members because the greater the degree of mechanization the greater the need for engineers.

In his speech, Mr. Parker said the future of the industry must lie in mechanization, but he emphasized that if the introduction of machines was not successful the financial losses would be heavy. "It may be that in the years to come new methods and new machines will solve a lot of problems, but what we must rely on is the skill and ability of the individual. I do not know any single factor in this industry that can count more than the quality and work of the engineer," he said.

Mr. Anderson presented the President's Medallion to Mr. B. E. Shaw (branch president), in memory of his father, Mr. Alexander Anderson, a former AMEME president and first president of the branch.

NCB Must Improve Production Methods: Mr. H. B. Taylor

GIVING a lecture on "Fuel and Power" at a meeting of the Coal Industry Society at Mansfield Woodhouse (Notts), last week, Mr. H. Bernard Taylor, Labour MP for Mansfield, said: "If the National Coal Board is to compete with oil in the next few years, it will have to consider improving production methods and stopping the drift from the mines." The board was now facing difficult times, he added, and the national target would have to be dropped in 1965 due to the increasing competition of oil.

Since oil had to be transported long distances and came from politically unstable areas, the NCB should be told how much coal it should produce to meet the country's requirements.

ABOUT 900 MINERS returned to work on Monday at Kingshill No. 3 Colliery, Shotts (Lanarkshire), after a one-day strike caused by a wage dispute.

NARROW WORK IN COAL MINING

Part 1: Past and Present Heading Machines

by R. B. DUNN, B.Eng.(Min.)*

Although output from room-and-pillar methods has declined and in 1959 amounted to about 14,000,000 tons, the complete elimination of narrow work is neither possible nor desirable. The first part of this paper, which was presented to the Scottish Branch of the National Association of Colliery Managers on March 8, 1961, relates some past achievements in the rapid drivage of narrow headings and compares some of the machines used in narrow work today. The second part of the paper, completing the comparison of present-day machines and reviewing the possible development for the future, will be published in next week's IRON AND COAL.

CHANGES in the approach to the problem of driving roads or headings in a seam of coal can be said to have taken place in 1942, when largely as a result of wartime lend-lease arrangements, more highly developed types of American mining machinery were made available. These machines were developed exclusively for narrow work systems which were then, and still are, the main method of underground working in that country. While many of the British successes with this machinery were both local and short lived, they nevertheless served to stimulate new thinking; and a representative cross-section of British mining engineers took advantage of lectures addressed by the American experts. This stage was followed by the inclusion of American mining equipment in the training programme given at the former Sheffield mine mechanization training centre for colliery personnel.

The advent of nationalization with the increased opportunity for studying mining conditions abroad introduced its own particular benefits in the field of narrow drivages. Reference must be made to the pioneer installations of Joy continuous miners in this country[1]. Apart from attaining a cutting rate per shift never before reached, they introduced for the first time the possibility of obtaining bulk output from a source other than a longwall face and with equivalent or improved section productivity. Where mechanized mining has been used in this field it is interesting to note that the average output per annum per machine has increased from 17,517 tons in 1954 to 26,560 tons during 1959.

PROBLEM ANALYSIS

The problems of narrow work can be divided into two parts. The first deals with the driving of headings within that section or height of seam from which production is being sought. The second part deals with the drivage of roadways in a seam from which the seam section to be worked represents only a proportion of the total height of drivage. Both types of problem need to be considered separately as encountered in longwall development or stoop-and-room methods of extraction.

With a longwall layout, drivages within the working height of a seam are generally for one or two purposes, either the driving of a face line or for exploration. For driving a face line or short-distance exploration the problem of technique has to be a compromise between the speed required and the availability of suitable plant. Where short-term development is well forward the need for rapid drivage is absent and such can be justified only where there is a clear advantage in cost. Drivages of this type can be used either as a task suitable for coal faceworkers without any special skill or, alternatively, as an opportunity for the more skilled miner to apply his ability and his preference for work in a small team.

Every type of conveying equipment used on coal faces must at one time or another have been used for this type of drivage. Very often the equipment to be used on the production face line will have some bearing on the type of conveyor used for development. The problem of cheap drivage may become compromised in advance by longer term considerations. There has been little change during recent years at the face of a drivage of this type other than the present-day trend to replace coal cutters with pulsed infusion shotfiring. This development has indeed been timely as the reduction of shortwall cutting machines in use, and the general reduction in the number of machinemen available in many of our collieries could have introduced a difficult problem in

* Production manager (West), Area No. 1 (Fife), Scottish Divisional Coal Board.

driving coal headings where hand methods were unsuitable.

The production of a low cost, low weight continuous mining machine to assist local development is obviously attractive and the introduction of the Wilcox miner into this field represents an important start in the task of mechanizing localized development work and exploration. It may, in addition, make available pockets of coal flanked by longwall extraction which would otherwise be left behind. Used in this way the cost of a small size continuous mining machine can be defrayed against a higher annual district output and in turn reflect a cheaper cost of development.

The second type of seam drivage problem is associated with long-distance exploration work, for a longwall layout and also with the driving of headings for stoop-and-room working. Where exploration or development is the prime consideration then the major factor is one of distance travelled per shift or per day. As advance per shift and bulk output per shift are normally synonymous the problem can be made the subject of a simple analysis.

Under these conditions there is no need to compromise on problems associated with manpower or technique. The use of the shortwall coal cutter with associated conveyor equipment has been pre-eminent for many years and on occasion extremely creditable rates of advance have been obtained. Unfortunately, however, the average results are often well below the best standards of performance and in analysing the reasons two factors are frequently encountered. Firstly, there can be a shortage of both skilled operators and skilled supervision. Secondly, rapid advance requires a sustained effort on the part of the team. Even where environmental conditions are favourable, the problem of accelerating the working tempo becomes more difficult each day as the old incentives become less applicable.

The answer to this problem is to use a machine to set the tempo by which everything follows in sequence. The managerial problem thereafter centres on the provision of adequate transport facilities to keep the machine in motion. Naturally, machinery used in this way must both cut and load coal and requires the minimum physical effort on the part of the operating team. The machine cutting time thereby becomes a period of rest between spells of physical work, for the completion of the cyclic functions required when the machine is stopped. Ideally, the cyclic functions should be reduced to the minimum or be performed in such a way that they do not interfere with the functions of coal extraction. Roof support and conveying are the obvious problems, of which the former presents the major difficulty.

The development of associated conveyor equipment to provide for a rapid follow-up during the working shift is referred to separately. The cutting cycle, however, is a function of the frequency with which supports need to be set, either temporarily or permanently, and until the problems of mechanically mining the coal and simultaneously supporting the roof have been resolved, then the true potential of this type of mining will not be realized. Where the seam is of substantial thickness then the problem of heading and roadway drivage can be one and the same, but a different treatment is required where roof and floor metals have to be taken along with a coal section. In terms of rapid drivage, a road of this type represents a problem. Stone mining methods cannot be applied so far as shotfiring is concerned and, although drilling may be easier, time taken in shotfiring can more than offset this advantage.

Where the seam has reasonable height then the extraction of the coal seam ahead of the roadway drivage has certain advantages, but is difficult to perform simultaneously. If these operations are to be performed on separate shifts then the speed of advance will be limited by the speed of driving the road and for this purpose the cost of expensive mechanized equipment could only be justified in the exceptional case. Perhaps the main advantage of separate treatment is the maximum recovery of the available coal which may in itself pay for the cost of drivage.

There has been little interest and perhaps little justification for any major effort in developing a heading machine suitable for this type of duty. Some local success has been achieved with the extension of certain coal drivage machines to deal with softer shales or thin bands of stone found in conjunction with a coal seam. Generally, the length of the roadway drivage required in a seam in any one working district within any one year would not justify incurring the problems and cost of transporting, installing, and overhauling a continuous miner between the completion of short periods of duty one one location and being transferred to another.

Rapid drivage under these conditions can best be assisted by conventional types of power loading only to speed that part of the cycle associated with filling. Most of the power-operated shovels or loaders are sufficiently mobile and transportable as to give maximum service in any one year even where the location has to be periodically changed. Most machines of this type have been developed over a number of years; they are reliable and do not represent a very high capital outlay.

HISTORICAL REVIEW

Before dealing with present-day results it is of interest to make reference to three coal drivages which took place at approximately 10-year intervals from 1930 onwards. It must be remembered that each in their day represented a milestone of achievement and set a high standard for future years. Today's problem is twofold; firstly, there is the need for management to extend proved applications and secondly to search for an even more advanced technique to take progress one step further.

The first example refers to the drivage of coal headings in the Parkgate Seam at the Beighton collieries of the Sheffield Coal Company during 1933, where a 12-ft. wide heading was advanced 321 yd. in 15 working days. The roadway was

supported by wooden props 5 ft. 6 in. long and 5-in. by 4½-in. section girders, 10 ft. 4 in. long set at 3-ft. 4-in. centres. The inclination was 1 in 12 and the depth of working 350 yd.[2]. Equipment used included a crawler-mounted Universal AB machine on which was used both to undercut and to shear. Undercutting was done in a band of dirt 1 ft. 9 in. above the floor to a depth of 6 ft. and two shearing cuts in coal were taken in addition.

It is interesting to note that the percentage of round coal and reduced shotfiring resulting from this method of preparation was the subject of special mention at the time. Coal was loaded by an M & C Joy loader, also crawler mounted, at a capacity of 1½ ton/min. and discharged on to a shaker conveyor with 26-in. wide troughing and thereafter on to a conventional type gate belt. Ventilation was supplied by a 1,250 cu. ft./min. fan using 10-in. dia. steel ventilation tubes.

The working team consisted of six men who were paid on a yardage basis; and an analysis of the cycle[3] was as shown in Table 1. The advance of the heading per cycle was 6 ft. 2 in. and the total weight of coal loaded out per shift was 13.7 tons.

TABLE 1.—*Time Analysis and Cycle of Operation for Heading at the Brighton Collieries in* 1933.

Operation.	Time.	
	Min.	Sec.
Undercutting	10	—
Withdrawing machine and putting on first shearing cut	8	—
Withdrawing machine and putting on second shearing cut	6	45
Drawing AB arc-waller back into side of heading	—	35
Filling out holings with Joy loader	4	—
Boring six holes with electric drill	6	30
Stemming and firing	20	—
Loading	33	—
Setting girder	6	—
Time of complete cycle	94	50

The performance made possible rates of drivage exceeding 20 yd. per day. It focused attention on a new field of possibilities which was the same in 1933 as it is today, namely, the prime importance which must be attached to reducing the time during which capital put into an undertaking remains idle. Perhaps the greatest hope of the authors in 1933 was the possibility of using a system of rapid drivage in preparation for a retreating system of longwall mining, and while it was noted in 1933 that there were seams where narrow drivages did not provide suitable road conditions there were nevertheless many applications where they did.

The same observations are applicable today and it is perhaps disappointing that so little serious effort has been made to combine the advantages of the two systems where roadway and ventilation conditions permit.

The second example refers to coal drivages in the Diamond Seam at Comrie Colliery[4] which was started in the year 1944. Measures in this installation were more steeply inclined and averaged 1 in 4.5 The pattern of working consisted of driving pairs of headings to the rise, each place being 15 ft. wide at 70-ft. centres. From the development headings, levels were driven to either side with similar spacing to a length of approximately 100 yd. Where conditions were favourable 70 per cent. extraction was practised by thinning down the intervening pillars on the high side.

The machinery used included Goodman shortwall coal cutters with Duckbill loaders at the face, while auxiliary conveying was either by additional shaker or belt conveyors. The main trunk conveyors were 45-h.p. Meco units using 30-in. wide belt, each unit being 300 yd. long. It is interesting to note that the belt speeds at that time were 450 ft./min. and the loading point was designed to handle 1,000 tons per shift of run-of-mine coal. Using this equipment a complete cycle of working was as shown in Table 2.

TABLE 2.—*Cycle of Working in Coal Drivages at Comrie Colliery in* 1944.

Operation.	Time.
	Min.
Flit coal cutter in, cut and flit back	20
(One man starts hole boring when coal cutter is half way across the heading)	
Two men assist to stem holes and then fire shots	25
Clean out centre and erect girder on centre clean out sides and erect both end props	15
Total	60

The thickness of the seam was aproximately 7 ft. and the roadway was supported by wooden props and 15-ft. "H" section roof joists set at 6-ft. centres. Undercutting took place at the floor level to a depth of 7 ft. Three men were employed at the face of each drivage and a separate team was responsible for handling materials. Two production shifts were used, leaving the nightshift for belt maintenance and flitting the Duckbill loaders and the shortwall coal cutters. The basic day wage paid to the faceworkers was based on three complete cycles per shift. Added incentive permitted a level of six cycles per shift being attained, but four cycles was accepted as being a good performance.

Although gradient conditions do not permit a direct comparison, it is interesting to note that compared with the example previously quoted of 11 years earlier the rate of advance per shift had increased from 25 ft. to 28 ft. with a best performance of 40 ft. in a shift. The equipment used in both drivages required the cyclic preparation of the coal, including drilling, cutting and shotfiring, followed by power loading of the prepared product. No radical change in the equipment had taken place in the 11-year interval so that the improvement in results can only have been obtained by the improved application of known methods. The men and management team must have exercised a very exact control on the performance and time taken for each part of the cycle, which reflects both aptitude and skill by the whole team.

Results of this type can be included among the best standards of performance where cyclical systems of narrow drivage have been applied to typical British coal-mining conditions. Where results of this type can be achieved the return

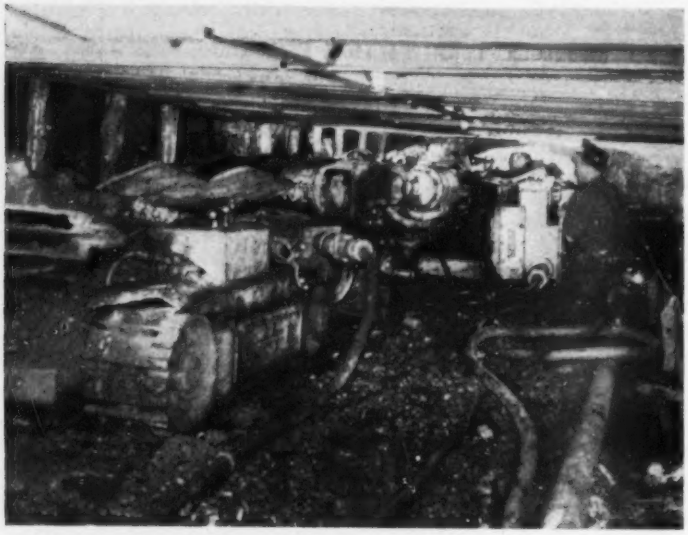


FIG. 1.—THE JOY CONTINUOUS MINER TYPE 3 JCM 4 AT WORK IN THE 4-FT. 6-IN. LOCHGELLY SPLINT SEAM AT BLAIRHALL COLLIERY.

on the capital investment for the plant involved is very rewarding.

The example of the third, and more recent milestone, took place at Blairhall Colliery during 1959 and 1960, where the need for rapid drivage was associated with an extensive development programme in the Lochgelly Splint Seam. The initial problem was the drivage of a roadway in the seam some 1,600 yd. long to the dip with the object of connecting the termini of two main locomotive levels[5].

The working height of the seam was 4 ft. 6 in. including some 4 in. of overlying soft shale. The blae roof had a clean parting above the shale and the floor consisted initially of a soft fireclay. After a very short distance the fireclay floor became particularly hard. As the initial drivage was required an as airway for some two years it was decided to cut in the floor to give a working height of 5 ft. The roof was supported by 5-in. by 4½-in. joists set at 3-ft. centres, properly located by struts and punch props. At the face the joists were supported temporarily by Dobson hydraulic props fitted with suitable head pieces; these were subsequently replaced by rigid supports.

It was decided to use a Joy continuous miner type 3 JCM 4 (Fig. 1) for this development work and associated equipment included a Joy 12 BU Loader and a Joy 20-in. gathering chain conveyor delivering onto conventional gate belts.

The system of mining was continuous within the limits prescribed by the timbering regulations, an additional set of permanent supports being set every 3 ft. of advance. The Joy 12 BU loader was used to provide a buffer in the event of minor stoppages in the conveyor system and when the continuous miner was allowed to discharge on the floor, it also increased flexibility in the use of the auxiliary chain feeder; longer distances could thus be travelled between extensions and greater freedom provided for the prior assembly of the extension structure. This arrangement also permitted increased flexibility in turning corners which allowed for a complete distance from the face of the drivage to the delivery end of the loader amounting to approximately 50 ft., which could then be negotiated before an additional conveyor was required. This useful flexibility can have practical benefit where extraction type layouts are being considered.

Because of the extended supply problem the operation of the machine was confined to one shift per day. Apart from the daily extension of track and chain conveyor, a full move-up of the conveyor system took place on a weekly basis. The most cumbersome but one of the most valuable pieces of equipment in the roadway was the Bush dry-type 300-kVA FLP transformer, which was at that time one of the first to be used in British mines. The advantage in having the transformer virtually on the tail of the continuous miner had a very beneficial effect on the performance of the electrical equipment and, indeed, is now considered indispensible in planning all future installations of continuous mining machines.

Other Equipment

Other equipment in the roadway included an auxiliary Pikrose hoist, and a Mono pump, type D.10, for dealing with the small make of water. Ventilation was provided by 24-in. dia. two stage aerofoil fans, installed in series at approximately 400-yd. intervals. Butt-jointed steel tubes with rubber rings were used, and total leakage was limited at the end of this drivage to 21 per cent. of the intake air. Due to the concentration of machinery near the face, flexible ducting was used for the last 150 yd.

Under these conditions, the average performance during a full working week reached 48 ft. per shift of completed work with a team at the face consisting of three men paid on a sliding scale based on cutting performance. While these results are not intended to define the capacity of this machine purely for coal extraction, they illustrate its adaptability to a wider range of mining duties than hitherto applied. This can be an important factor in considering the capital expenditure involved as it permits more continuous deployment of the machine.

SOME PRESENT-DAY EXPERIMENTS

With a greater accent on development in parts of the Fife coalfield it became necessary to consider all possible methods of increasing the tempo of drivages in the horizon of certain coal seams. Seam thicknesses varied from 30 in. to 9 ft. and above, gradients at their kindest were undulating and in many locations were steep and in excess of 1 in 3. A water problem had often to be taken into consideration.

It was decided to extend the use of Joy continuous miners for a major part of this programme and to supplement these machines with a unique cross section of other continuous miners which were either readily available in Great Britain or could be specially obtained for trials and testing. The following is a brief report giving details of certain more interesting applications, together with operational comments.

Wilcox Miner

The first British installation of the Wilcox miner was made in late 1959 at Fordell Colliery for development work in a seam of between 30 and 36 in. thick. The experiment had two objectives. Apart from driving proving roads and face lines within the working height, it was decided to use the machine to enlarge the original drivage by cutting a further 3 ft. in the floor which consisted of a mixture of 50 per cent. coal and blae. The machine proved to be successful for both duties.

The main advantages are the relative light weight which affects mobility in the pit and low power requirements which avoid any special electrical problems in the development district. The machine is particularly suitable where roof conditions are tender, requiring a minimum depth of unsupported ground at the face amounting to 6 ft.

No particular skill in operating the machine is necessary other than strict observance of good standards of shortwall cutting practice, and the machine as used can be applied to a range of cutting heights varying from 26 in. to 42 in. The mechanism of this original American-made model has proved robust, simple, and cheap to maintain.

In the original test under generally weak roof conditions, the road was supported at 3-ft. intervals by 4-in. by 4-in. RSJ girders, 15 ft. long, supported by rigid props (Fig. 2). Floor conditions were un-

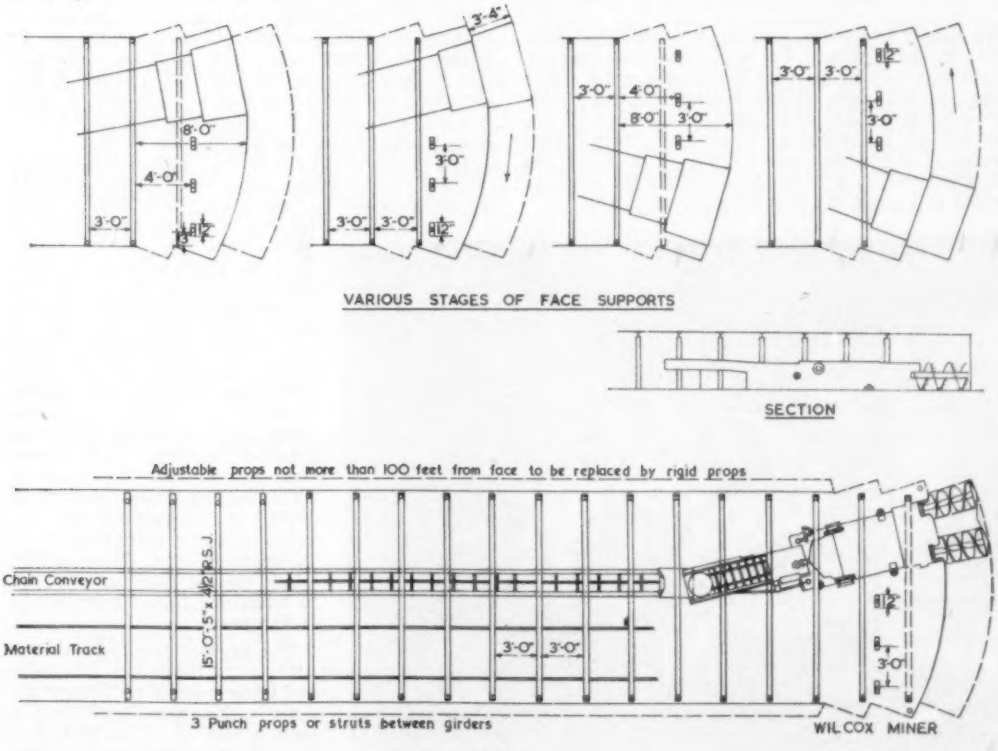


FIG. 2.—METHOD OF SUPPORTING HEADING IN A 30-IN. TO 36-IN. SEAM AT FORDELL COLLIERY USING A WILCOX CONTINUOUS MINER.

dulating and often wet. Without special attention, the machine has proved capable of cutting regularly 17 ft. per machine shift and has reached a maximum of 25 ft. per shift. The operation is cyclic and the augers, shown in Fig. 3, constructed to cut 41 in. deep, giving an effective advance of 36 in./cut.

To prove the suitability of this machine under steep conditions it has been tested locally at gradients up to 1 in 3 dipping and 1 in 2½ rising. Within these gradients the machine has proved to be mechanically and operationally reliable. Some trouble was experienced when a cross gradient exceeded 1 in 5. It was found that the machine tended to slip when stells were being reset during cutting across the face and to overcome this problem a spring-loaded stell was fitted which proved effective. For improved control when cutting steeply to the rise, a beam was fabricated from 4-in. by 4-in. joists. The main beam was pinned to the floor and contained a sliding bracket which was also attached to the machine, thereby only allowing the machine to traverse the face of the drivage or to swivel as required. The critical gradient to the dip occurs at 1 in 3, when the elevating conveyor from the throat of the machine begins to exceed the normal angle of repose.

TABLE 3.—*Time Cycle Analysis Using the Wilcox Miner.*

Operation.	Time.
	Min.
Sump into coal	6.7
Open out corner	4.8
Erect support	5.8
Traverse the face	8.2
Open out corner	6.7
Total	32.2

A typical complete cutting cycle for this machine takes about 30 min. and an average analysis is given in Table 3. The thickest seam height tested has been 3 ft. 8 in. and the most successful range of working heights probably lies between 3 ft. and 3 ft. 6 in.

A particular disadvantage with the original American manufactured model was degradation of coal in the throat of the machine prior to elevation.

The augers were seen to cut a coarse product, but the conveyor clearance in the throat of the machine was small; the average percentage of over 2-in. coal on test was shown to be only 4 per cent. It is understood that the British version of this machine has increased the conveyor clearance distance to approximately 9 in. with marked effect on coal size. Other improvements include better handling, resulting from changes in the internal jacking system. Auxiliary electric motors have been eliminated and substituted by hydraulic units supplied from a 15-h.p. hydraulic pump now integral with the driving gear.

Colmol Machine

Installation of a Colmol machine, made by the Jeffrey Manufacturing Company, took place late in 1960 at Comrie Colliery for the purpose of accelerating the development programme in the Lochgelly Splint Seam. The machine, shown in Fig. 4, had previously been converted to suit British electrical standards and was initially put to work in a dip drivage, 15 ft. wide, at a gradient of 1 in 6, in a height of approximately 3 ft. 10 in.

The machine is powered by three 50-h.p. electric motors, two of which drive the cutting arms and the third providing power for the hydraulic drive to the conveyor, control mechanism, and the crawler tracks. The working section is completely augered by two banks of cutting arms fitted with suitable picks and rotating at 52 r.p.m. The cutting arms rotate in clockwise and anticlockwise directions on opposite sides of the central gathering conveyor to assist in gathering up the cuttings. The lower bank of five cutting arms is fixed, but the upper bank of 10 arms can be hydraulically elevated to give a cutting range of between 38 and 48 in. The whole cutting head can be tilted to overcome minor undulations in the seam.

The crawler tracks provide a continuous thrust on the picks and under normal cutting conditions in this rather hard seam a cutting rate of 4 in./min. has just been maintained. Pick replacements have so far been surprisingly few; coal degradation is, however, serious, but

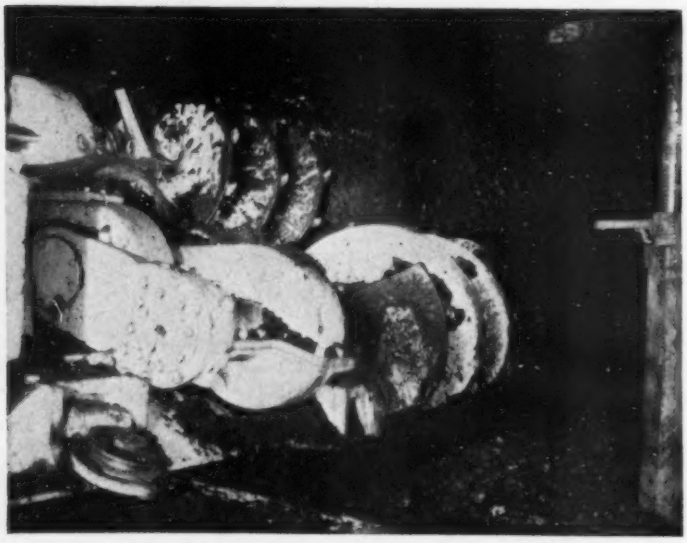


FIG. 3.—THE AUGERS OF THE WILCOX CONTINUOUS MINER GIVING A DEPTH OF CUT OF 41 IN.

dust is kept under control by 10 water sprays fitted behind the cutting arms.

In the original trials the Colmol was used to drive a series of face lines for which the 9-ft. 8-in. width of the machine gives a suitable width of excavation. This is the ideal application for the machine, but it can be used for driving a wider roadway, though not as efficiently. The temporary support required by a wider excavation would further increase the loss of productive time.

Support at the face (Fig. 5) is provided by 9-ft. corrugated straps set with hydraulic props at 3-ft. centres. Due to the lack of forward clearance it has proved impracticable to set temporary supports near to the face, but permanent supports are set in front of the machine operator at a maximum distance of 12 ft. from the face. The time taken for a new setting of supports averages 10 min., which is the same time required for the machine to cut the distance between adjacent bars. This means that the maximum cutting time possible is only 50 per cent. of the available operating time.

To date, the machine has proved reliable, but the large number of hydraulic hoses, located in almost inaccessible places, could prove troublesome. Routine lubrication is also hindered by the lack of space. It is interesting to note that the separate hydraulic systems work under different pressures with the fluid pressure for traction at 2,000 lb./sq. in., the conveyor system at 1,450 lb./sq. in., and the jacking system at 1,200 lb./sq. in.

In the initial trials cutting figures exceeded 30 ft. per shift and the weekly advance reached 50 yd. It is hoped that these figures will be improved as further experience is gained. These limited trials have proved that the machine has an application under average British mining conditions and can be successfully operated in a coal seam known to be harder than average. The principle of augering is almost a necessity for truly continuous mining machines and the Colmol continuous miner amply demonstrates the practical application of this system and its potential. The principal disadvantage is manoeuvrability to suit changes in gradient. This problem is directly affected by the position of the cutting head in relation to the tractive force (in this case the crawler tracks) as a separate sumping-in operation to prepare for a changing gradient is not possible during normal cutting operations.

In making a change in the cutting horizon the cutting picks, in addition to drilling in a forward direction, are required to ream the excavation, either vertically upwards or downwards according to the change being made. The machine design, as tested, may not have adequately catered for this type of loading which would be regularly encountered in those areas where undulations in the seam are a regular feature.

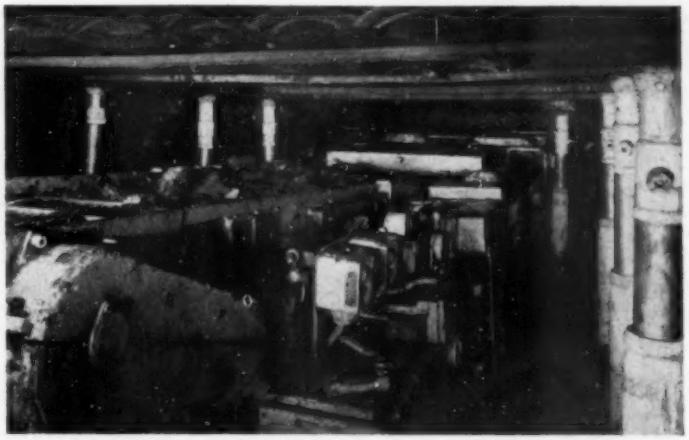


FIG. 4.—CONTROLS AND CONVEYOR OF THE JEFFREY COLMOL IN THE LOCHGELLY SPLINT SEAM AT COMRIE COLLIERY.

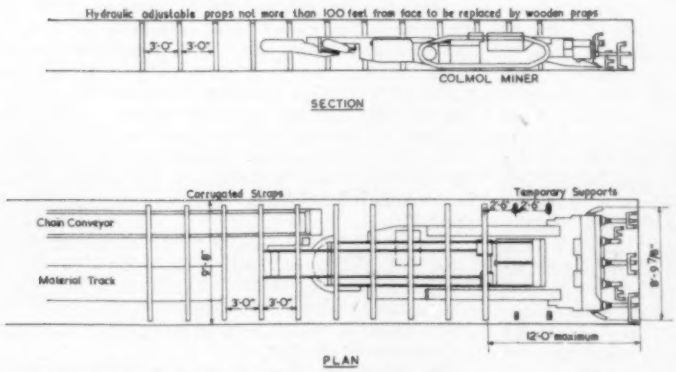


FIG. 5.—SUPPORT AT THE FACE OF A HEADING USING A COLMOL MINER.

Marietta Miner

Several experiments with the Marietta machine have already taken place in Great Britain and its principal details are well known. Briefly, this is a further example of an augering machine, but it is supplemented at the periphery by an orthodox coal-cutting chain to remove fillets. It is a truly continuous miner, the cutting operation being non-cyclic.

FIG. 6.—AUGER HEADS AND CUTTING CHAINS OF THE MARIETTA MINER.

Preparations for a trial with this machine have been made recently at Bowhill Colliery, where it will be required to drive proving roadways in the major reserve contained in a thick seam of coal. Access to the area was planned by using an existing, but long disused, dook drivage, some 230 yd. long in the same seam. The average height of this road has reduced to approximately 4 ft. and the average gradient for the first 200 yd. is 1 in 2.2. Beyond this point the seam gradient quickly flattens and enters an extended shallow gradient basin. In order to simplify transport of the machine to the foot of the old dook it was decided to assemble the Marietta miner at the dookhead. Prior to ripping this old road to permit flitting the assembled machine it was decided to test how the Marietta would behave on this particularly severe gradient. During this test the machine cut some 20 yd. of soft coal and blae floor on the full dip of 25 deg.

Mechanically and electrically the machine has functioned in a satisfactory manner, but the problem of moving 27½ tons of machine in reverse on this gradient presents a difficulty even with the assistance of a hydraulic winch mounted at the dookhead. The greatest problem was in clearing the throat of the conveyor which was elevating at an angle of 37 deg. to the horizontal. While the flights were able to lift the coal cut from the pavement, blockage took place with debris accumulated on the floor of the old roadway. A critical appreciation of the machine under these conditions suggests that a gradient of 1 in 3½ to the dip would present an upper limit unless operating conditions were particularly favourable.

It is interesting to compare the main features of this machine with the Colmol. The Marietta requires less power, being fitted with two motors, with a total h.p. of 125. The main motor of 100-h.p. drives the two auger heads and cutting chains (Fig. 6), while the 25-h.p. motor drives the three hydraulic pumps. The large-diameter auger heads rotate at a phase angle of 90 deg. and turn in opposite directions. The speed of rotation is 13.5 r.p.m. with a pick speed of 297 ft. min. The cutter chain sprockets rotate at 88 r.p.m. giving a chain speed of 176 ft./min.

The machine can be adjusted for seam heights varying between 7 and 8 ft. The total width of the heading taken at a mid point between floor and roof is 12 ft. 10 in., but the width at floor level is only 10 ft. 6 in. The machine is not suitable for driving roads of a larger width, although this would not be impossible if needed. Because of the shape of the road the "H" section roof girders were restricted to a length of 10 ft. and conventional forepoling arrangements were used in advance of the last permanent setting. The prescribed maximum distance between the last permanent setting and the face is 12 ft.

Jacks fitted to the machine allow the raising or lowering of either the cutting end or the rear end and also permit adjustment for cross gradients. The thrust of the machine has been measured under test as being 28,000 lb. against a calculated thrust of 30,000 lb. Cutting speeds can be controlled within the range of 3 in./min. to 4 ft. 7 in./min. maximum. Flitting speeds can be varied between 18 in./min. and 13 ft. 6 in./min.

One of the operational limitations with this machine is the rather short overhang of 5 ft. on the discharge conveyor. This limitation necessitates the use of either an additional bridge conveyor or a loading machine in tandem for delivering onto the roadway conveyor system. Principally because of the size of the machine, the hydraulic hoses are more easily accessible; an automatic lubrication system is fitted and the points requiring manual lubrication can be conveniently examined.

For transport the tractor frame is 17 ft. 10 in. long, 7 ft. 6 in. wide, and 2 ft. 4 in. high, and it weighs almost 6 tons. The main frame, with similar plan dimensions, weighs 4 tons and the cutter gearbox, which is more compact, also weighs approximately 6 tons.

The Marietta miner is only suitable for thick

seams. It is truly continuous and has an exceptionally high capacity for extracting coal. One of the weakest features is the total number of picks. A number of the picks were a poor fit in the pickboxes and had to be ground before fitting. The machine is both heavy and bulky. Using the augering principle it required a continuous thrust for maximum cutting efficiency. Unless the speed of cutting can be maintained above the minimum of 3 in./min. it is obvious that slip will take place and there will be a varying thrust applied to the cutting head. It should be noted that this machine is now several years old and in the interval has been subject to modifications by the manufacturers.

FIG. 7.—DOSCO MINER WITH CUTTING HEAD EXTENDED BY BOLLARDS.

Dosco Longwall Miner

The Dosco longwall miner was originally designed to apply the cutting head of the JCM to a longwall buttock mining machine. In this capacity it has performed with good results, giving tonnages per machine shift exceeding 400 tons and a high face productivity exceeding 4 tons per manshift. As designed, the Dosco longwall miner does not lend itself to present systems of mechanized coal-face supports.

Credit is due, therefore, to the late Mr. I. G. E. Leek, who believed that the Dosco miner could be converted in a simple but effective way to form a heading machine. Modifications have basically consisted of extending the cutting head by suitable bollards, shown in Fig. 7, to cut a total width of 11 ft. 6 in. and so enable the machine to cut its own clearance and give a width of roadway drivage adequate for most purposes. With a jib 6 ft. long the machine can cut from the floor to a total height of 7 ft. which in most cases is a suitable upper limit for the hand setting of supports.

After cutting out the coal the main problem has become one of gathering and transporting the coal back to the conveyor system. On one side of the machine an auxiliary chain conveyor is at-

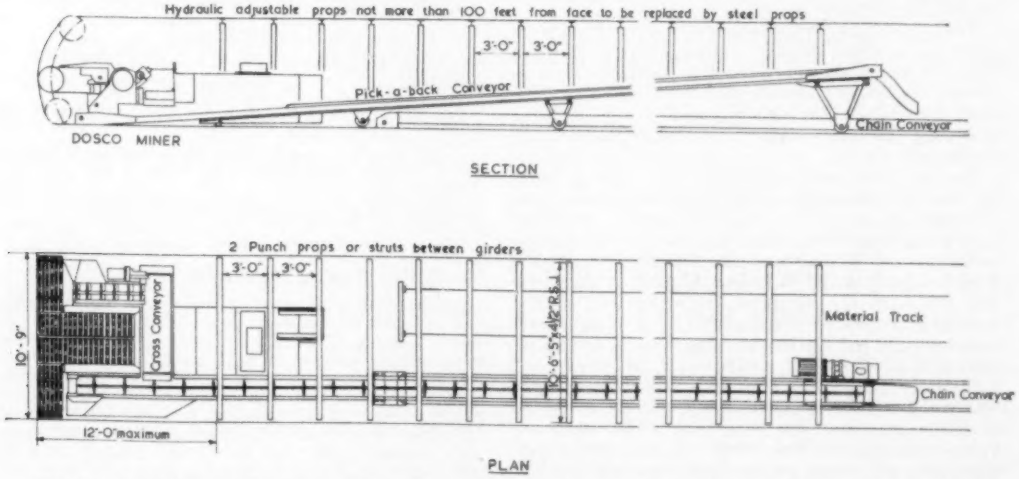


FIG. 8.—ROOF SUPPORT SYSTEM IN A COAL ROADWAY DRIVEN BY A DOSCO HEADING MINER, NO. 55, USED IN CONJUNCTION WITH A BRIDGE CONVEYOR.

tached to elevate coal onto the cross belt. On the delivery side of the cross belt a light-type chain conveyor is attached both to take delivery from the cross belt and to take up cuttings from the bollards extending out on that side of the machine.

This conveyor is assembled to a suitable length, the weight either being suspended from the roof supports or used as a bridge conveyor and supported by the fixed roadway chain conveyor, as shown in Fig. 8. This system of mining therefore becomes a compromise between the "piecemeal" approach by the Joy miner and the augering action of the Marietta or Colmol.

First Installation in Germany

The first installation of this type of conversion was made at Pattburgh Colliery, Homberg, West Germany, and resulting from its success it is understood that further installations are planned. It was originally installed in the Hermann Gustav Seam, taking 6 ft. 2 in. of coal together with 4 in. of shale from the roof. The roadway advanced on a level line and the original width of heading, prior to extending the bollards, was 9 ft. 9 in. One complete cutting cycle took approximately 4½ min., but the sumping stroke was limited to approximately 6 in. Used in this way an advance of 55 ft. per shift has been obtained with a team of three operating the machine and setting temporary supports. These supports were light alloy bars 8 ft. 4 in. long set at intervals of 2 ft. and were replaced by permanent supports consisting of 9 ft. roof bars set on Usspurwies legs.

Based on this performance and with a spare Dosco machine available for modification, it has been decided to test the suitability of this idea to British mining conditions and a machine is currently completing an overhaul and refit in the Cowdenbeath central workshops with a view to being tested underground in a companion roadway to the Marietta miner.

The converted Dosco miner will continue to be powered by three electric motors totalling 200 h.p. The two main motors of 75 h.p. each are used to power the cutting chains and bollards, while the third motor of 50 h.p. is used to drive three hydraulic pumps. All the electric motors are water-cooled.

The machine has been fitted with a jib designed by the Central Engineering Establishment of the National Coal Board and carries the extended headshaft, bollards, and cutting chains. The bollards are 2 ft. dia. over the pick points and have a pick speed of 727 ft./min. Altogether there are 816 picks on the machine, including 312 on the bollard assemblies. These picks are a round shank type and the cutting height ranges from 4 ft. 6 in. to 7 ft.

Two elevating jacks, each with a thrust of 8½ tons, and which can be operated independently, are fitted at the rear end of the machine. The jacks are used to lift the machine when it is necessary to cut floor coal or to give access under the machine for maintenance purposes. They can also be used to level the machine on a cross gradient. The thrust applied to the cutting head by the two sumping jacks is 8½ tons. Traction speeds vary up to 38 ft./min.

Two banks of sprays are fitted above the gearboxes, each containing four nozzles which are directed to cover the whole of the cutting head. The quantity of water used is approximately 9 gal./min. and this water is previously used for cooling the electric motors and the hydraulic oil. Lubrication of the cutting head and sumping slides is provided from an automatic grease pump fitted on the jib. One advantage of the Dosco miner is that the hydraulic system, including 105 hoses, is completely enclosed within the body of the machine. This prevents accidental damage, but restricts accessibility. The three hydraulic pumps driven by the 50-h.p. motor operate at a common pressure of 1,500 lb./sq. in. Each of two 20-gal./min. pumps drives one crawler motor and supplies one rear elevating jack. During cutting the two pumps work together to supply the sumping and shearing jacks.

A third 12-gal./min. pump drives the cross conveyor and operates the belt tension release cylinders. For narrow drivage work a fourth pump of 12 gal./min. capacity has been added to drive the short chain conveyor on the right-hand side of the machine. This short conveyor utilizes sprockets and structure from a BJ-D 61 AM conveyor which has been extended on this side of the machine for heading use.

As modified for use in the Fife coalfield the machine has been fitted on the left-hand side with a 15-in. Joy Sullivan scraper chain conveyor 80 ft. long, running at 150 ft./min. This conveyor will advance with the Dosco as a "bridge" conveyor delivering onto a 20-in. Joy Sullivan chain conveyor. For transport underground the heaviest unit is the main frame, weighing 7.7 tons; it is 12 ft. 8 in. long, 4 ft. 6 in. wide, and 3 ft. high. Total weight of the assembled machine is 17.8 tons.

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[1] NCB Information Bulletin. No. 52/68, "Joy Continuous Miner at Donisthorpe Colliery."

[2] Watson Smith, H., and Gullick, G. M., "Trackless Mining"—Trans., Inst. Min. Eng., Feb., 1933, Vol. LXXXIV, Part 5.

[3] Sinclair, J., "Rapid Drivage of Headings at the Sheffield Coal Company's Pits—Use of the Joy Loader," Colliery Guardian, Dec. 1, 1933, p. 1010.

[4] King, Henry R., "Colliery Modernization, with Special Reference to the Fife Coal Company's Collieries"—Trans., Inst. Min. Eng., Aug., 1945, Vol. CIV, Part II.

[5] Dunn, R. B., "Problems of the Scottish Coalfield and Their Treatment," Trans., Inst. Min. Eng., July, 1960, Vol. 119

Production Control Conference

Theme of a conference, organized by the Willesden and Hendon Productivity Association, to be held at the Federation of British Industries, 21, Tothill Street, Westminster, London, S.W.1, on November 22, will be "Production Control as a Means to Higher Productivity." Chairman will be Mr. J. R. Wilkinson, a director and general manager of Associated Electrical Industries (Manchester), Limited, Switchgear Division. The conference fee will be £3 3s. Details may be obtained from Mr. D. I. Duncan, Associated Electrical Industries, Limited, Switchgear Division, 20, Neasden Lane, Willesden, London, N.W.10.

ISI Special Meeting in the USA and Canada

ORE CARRIER EDWARD L. ROGERSON'S MAIDEN ARRIVAL AT THE INDIANA HARBOR DOCKS OF THE INLAND STEEL COMPANY.

Indiana Harbor Works of the INLAND STEEL COMPANY

In 1893 eight young men started a small rolling mill at Chicago Heights, Illinois, and from that the Inland Steel Company has grown to seventh position in the industry's capacity. The company's Indiana Harbor Works is among those which members of the Iron and Steel Institute will have an opportunity to visit during their special meeting in the US and Canada.

THE original plant began by rolling some 5,600 tons of bars a year on an old engine-powered, belt-driven hand mill. Soon after the venture started, it was decided to expand, and in 1902 steel was made in a new plant on the shore of Lake Michigan about 20 miles south-east of Chicago. This plant consisted of four open-hearth furnaces, a blooming mill, a bar mill, eight sheet mills, and a jobbing mill. The original ingot capacity of 85,000 tons per year grew to 620,000 tons per year by 1914, 1,575,000 tons by 1924, 1,965,000 tons by 1934, 3,400,000 tons by 1944, 4,700,000 tons by 1954, and 6,500,000 tons today. The company's employees rose from 1,386 in 1904 to 29,000 today.

Inland now has 531 by-product coke ovens, eight blast furnaces, 43 open-hearth furnaces, four blooming mills, two billet mills, two hot-strip mills, cold-strip finishing facilities, a structural mill, three bar mills, and a sheared plate mill. This is the Indiana Harbor Works, all located on a site of about 1,000 acres, with rights to fill in another 500 acres of lake area. In addition, Inland still operates the Chicago Heights plant. The original mill of 1893 has been rebuilt and modified over the years. The Harbor Works forms a peninsula jutting out into Lake Michigan. It is divided into three adjacent plants, No. 2, No. 1, and No. 3, lying in that order from north to south.

Raw Materials

All iron ore comes from the Lakes region and is brought in lake carriers up the Indiana Harbor Canal which borders the west side of the plant. Table 1 gives analyses of the ores used. All ore is screened to plus ¼ in. with the fines going to the sinter plant. There are three sintering lines of the continuous travelling grate type, with the characteristics shown in Table 2.

TABLE 1.—*Iron-ore Analyses, per Cent.*

Ore.	Range.	SiO_2	Al_2O_3	Bases.	Fe	P	Mn
Leslie	Mesabi	10.18	2.32	0.26	49.28	0.092	0.87
Billie	Mesabi	11.26	0.81	0.36	53.53	0.066	0.55
Berner	Mesabi	5.97	1.34	0.26	51.68	0.086	0.80
Belden	Marquette	9.92	2.56	1.02	52.34	0.071	0.31
Sherwood	Menominee	6.13	2.46	2.91	51.12	0.415	0.83
Marmion	Atikokan	4.92	1.47	0.25	52.20	0.028	0.27
Reserve pellets	Mesabi	8.09	0.40	0.25	63.55	0.022	0.24
Marquette pellets	Marquette	8.85	0.79	0.53	61.47	0.033	0.05
Algoma Sinter	Michipicoten	11.79	1.73	11.53	49.50	0.020	2.84

TABLE 2.—*Details of Sinter Plants.*

	No. 1.	No. 2.	No. 3.
Length, ft.	69	102	168
Grate width, ft.	6	6	8
Number of windboxes	10	16	21
Fan capacity, cu. ft./min.	100,000	150,000	440,000
Suction, in. of water	10–14	10–18	35
Capacity, ton/day	764	1,224	4,000

The sinter feed consists of varying amounts of Leslie, Sherwood, Berner, and Marmion fines, flue dust, filter coke, mill scale, and limestone fines. With Sherwood and Leslie ores, screened ore and sinter analyze as shown in Table 3.

TABLE 3.—*Ore and Sinter Analyses.*

	Screened ore, per cent.	Sinter, per cent.
SiO_2	7.91	10.08
Al_2O_3	2.40	2.51
Bases	1.74	9.37
Fe	50.31	53.18
P	0.272	0.154
Mn	0.64	0.63

Coal comes from company-owned mines at Wheelwright in eastern Kentucky and from purchases of West Virginia, Virginia, and Illinois coals. Coal used by the coke ovens averages about 11,200 ton/day total.

Limestone for the blast furnaces and open hearths comes from the company-owned Inland Lime & Stone Company, at Manistique, Mich. The stone is crushed and screened to plus 4 in., minus 6 in., at the quarry. Daily limestone consumption is about 3,600 tons.

Coke Plants

Seven batteries of by-product coke ovens, totalling 531 ovens, provide capacity for making 2,847,000 net tons of coke per year. Five batteries (385 ovens) are located in plant No. 2, two batteries (146 ovens) in plant No. 3. Table 4 gives some pertinent data on the ovens. Batteries Nos. 2, 8, and 9 are low differential combination gun flue type; all others are underjet. All ovens are heated with coke-oven gas.

With normal operation, 486 ovens are pushed per day, giving a gross coking time of 19 hr./oven. This schedule can be increased to 522 ovens/day, or 17.7 hr./oven. Coke from both plants contains 0.55 to 0.65 per cent. volatile, 93 to 94 per cent. fixed carbon, 5.5 to 6.5 per cent. ash, about 0.65 per cent. sulphur, and 5.0 to 6.5 per cent. moisture. By-product recovery is accomplished by conventional equipment at both coke plants.

Approximately 40 per cent. of the gas made is used to underfire the ovens. The surplus at each plant flows through a 50,000-cu. ft. gasholder and is then boosted to 4 to 6 lb./sq. in. pressure and put into the general gas lines to the mills. When the surplus coke gas supply is insufficient to meet the plant demand, it is supplemented with natural gas mixed with enough air (about five parts gas, three parts air) to give a calorific value of 570 B.t.u./cu. ft.

Blast Furnaces

Inland's iron is produced in eight blast furnaces with a combined capacity of 3,325,000 net tons per year. Six of these form a row in plant No. 2. Two furnaces (A and B) are in plant No. 3. Some characteristics of the smallest and largest furnaces are given in Table 5.

No. 6 furnace was converted to high top-pressure operation on its most recent reline. All furnaces are equipped with double skip hoists, motor-operated. Skip cars are of 110-cu. ft. capacity on Nos. 1, 2, and 3 furnaces, 180 cu. ft. on No. 4 furnace, and 196 cu. ft. on furnaces, 5, 6, A, and B. All skip cars dump into rotating distributor tops. Bells are operated by steam on Nos. 1, 2, and 3 furnaces, by motor on the others.

At plant No. 2, the furnaces are blown by eight turbine-driven blowers, five rated at 60,000 cu. ft./min., 30 lb./sq. in., two at 75,000 cu. ft./min., 30 lb./sq. in., and one at 125,000 cu. ft./min., 35 lb./sq. in. A duplicate 125,000 cu. ft./min. unit is now being installed. Plant No. 3 has three 75,000 cu. ft./min., 30 lb./sq. in. blowers. Blast for the furnaces is heated by the stoves of the two-pass, side com-

TABLE 4.—*Coke Ovens.*

	Plant No. 2.					Plant No. 3.	
Battery No.	2	6	7	8	9	A	B
No. of ovens	59	65	87	87	87	73	73
Oven width, pusher side, in.	17	16¾	16¾	16¾	16¾	16¾	16¾
Oven width, coke side, in.	19½	19¾	19¾	19¾	19¾	19¾	19¾
Oven length, inside, ft.-in.	37-7	37-7	37-7	37-7	37-7	40-5⅛	40-5⅛
Oven height, ft.-in.	12-0	12-0	12-0	12-0	12-0	12-0	12-0
Coal charge, ton/oven	16½	16½	16½	16½	16½	17½	17½

TABLE 5.—*Blast-furnace Data.*

	Plant No. 2.	Plant No. 3.
Furnace	3.	B.
Diameter of hearth, ft.-in.	17 3	26 6
Diameter of bosh, ft.-in.	22 0	29 6
Diameter of stockline, ft.-in.	16 6	20 9
Height, bottom to top ring, ft.-in.	91 5½	104 0
Height, iron notch to stockline, ft.-in.	67 4⅜	82 11½
Height of crucible, ft.-in.	10 2½	14 7⅛
Height of bosh, ft.-in.	13 9⅜	10 0
Height of straight section, ft.-in.	6 10⅜	9 7½
Working volume, tuyeres to stockline, cu. ft.	20,225	41,762
No. of tuyeres	12	16
Tuyere dia., in.	5 and 6	5, 6 and 7
Lining thickness, crucible, in.	31½	31½
Lining thickness, bosh, in.	27	25½
Lining thickness, stack, in.	40½	40½
Lining thickness, throat, in.	24½	39½
Big bell dia., ft.-in.	12 6	15 9
Big bell angle, deg.	50	53
Small bell dia., ft.-in.	4 8	6 6
No. of gas offtakes	4	4
Blast volume, cu. ft./min., average	44,459	71,225
Blast volume, cu. ft./min., maximum	48,000	85,000
Blast temperature, C., average	1,150	650
Blast temperature, C., maximum	1,300	815
Blast pressure at tuyeres, per sq. in.	18 5	19 0
Lb. of ore per net ton of iron	3,773	3,799
Lb. of stone per net ton of iron	733	657
Lb. of coke per net ton of iron, dry	1,526	1,684
Lb. of scrap per net ton of iron	24	11
Lb. of roll scale per net ton of iron	11	69
Daily iron production, average net tons	724	1,241
Daily iron production, maximum net tons	1,000	1,653
Lb. of slag made per ton of iron	913	904
Lb. of flue dust made per ton of iron	213	231
Fuel ratio, burden to coke	2.26	2.34

bustion type. Stove stack temperatures range between 200 and 300 deg. C. Blast temperatures to the furnaces are automatically controlled by mixer valves.

Gas leaves the furnace tops through four offtakes, which combine into two uptakes and finally into a single downcomer on all furnaces except No. 3, which has two downcomers. Furnace top temperatures range between 310 and 365 deg. F. Top pressures run 1.9 to 2.1 lb./sq. in. except on No. 6 furnace, which operates on high top pressure, and is maintained at 10 lb./sq. in.

Gas leaving the furnace tops generally contains 8 to 15 grains of dust/cu. ft. and has analyses somewhat as follow:—CO_2, 12.7-15.0 per cent.; CO, 25-27 per cent.; H_2, 2-4 per cent.

Three furnaces have venturi-type scrubbers which bring the dust content down to 0.02 to 0.04 grain/cu. ft. The other five furnaces are equipped with 40,000 cu. ft./min. disintegrators through which about 35 per cent. of the gas is cleaned to 0.07 to 0.09 grain of dust/cu. ft. for the stoves. In addition, furnaces A and B have electrostatic precipitators which bring dust content down to 0.001 to 0.005 grain/cu. ft. Surplus blast-furnace gas is used to fire boilers and in the soaking pits.

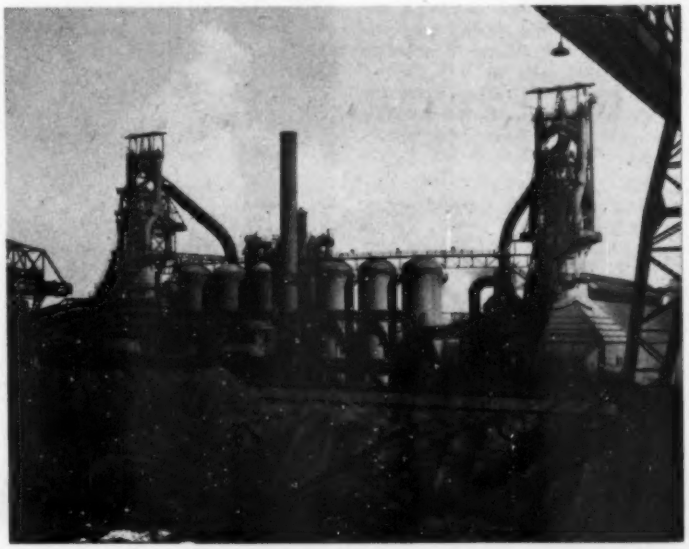
All furnaces usually produce basic iron of which practically all is used as hot metal in the open-hearth furnaces. Iron percentage analyses normally fall in the following range:—Si, 1.04-1.12; S, 0.028-0.032; P, 0.201-0.292; Mn, 0.62-1.43.

Iron is cast from each furnace every 4.8 hr. into mixer-type ladles of 100- or 200-ton capacity, which are then shifted to the open-hearth shops. Most of the blast-furnace slag is used for plant site fill.

Steelmaking

Annual steelmaking capacity is 6,500,000 tons. It is entirely open-hearth steel, there being 43 stationary basic O-H furnaces located in three separate shops. No. 1 shop has 12 108-ton furnaces constructed in conventional acid refractories, except one which has basic ends. Principal dimensions are given in Table 6, column 1. Killed, semi-killed, and rimmed steels are made, about 14 per cent., being of about 0.10 per cent. C, 62 per cent. 0.11 to 0.25 per cent. C, 22 per cent. 0.26 to 0.65 per cent. C, and about 2 per cent. above 0.65 per cent. C. The hot-metal-to-scrap ratio in the charge is approximately 60:40. Hot metal is taken from mixer-type ladles at a hot-metal station in the middle of the shop and cold materials are charged from 22 cu. ft. capacity boxes by overhead charging machines.

The fuel used is bunker C oil and natural gas via a water-cooled burner. 80 per cent. of the heat input being by oil. Total heat input rate is 60,000,000 B.t.u./hr. at maximum flow rate and averages 43,700,000 B.t.u./hr. The furnaces are fully instrumented. Three have automatic reversing equipment and six have fuel-air ratio control.



BLAST FURNACES AT PLANT NO. 2.

CHARGING-FLOOR SIDE OF NO. 2 OPEN-HEARTH SHOP.

Fuel consumption averages 3,716,000 B.t.u./ingot ton. No oxygen is used in this shop either for aiding combustion or carbon removal. Furnace performance figures average:—Charge-to-tap, 8-11 hr.; tap-to-tap, 9.14 hr., giving approximately 12 ton/hr. Heats average about 109 tons; the slag make equals 17 per cent. of the ingot weight.

Ingots made are mostly big-end-down, 22½ in. by 24½ in. by 84½ in. and 22 in. by 34 in. by 78 in., but some steel is cast into big-end-up hot-topped moulds to make ingots of 27¾ in. by 27¾ in. by 77¼ in. There are four pouring platforms and an extended platform for hot-topping preparation.

No. 2 shop has 24 furnaces in a line and is the longest open-hearth shop in the world. There are 10 furnaces of 170 tons and 14 of 200 tons. The 170-ton furnaces are of similar design and slightly smaller dimensions. A few of the furnaces are of all-basic construction and the remainder of silica refractories. The steels produced are 39 per cent. open-top rimmed, 17 per cent. bottle-top, 39 per cent. open-top killed, and 5 per cent. hot-topped killed. The charge is comprised of 50:50 hot metal to scrap, the hot metal being taken from one of two mixers (1,200 tons and 600 tons capacity) or direct from mixer-type ladle cars.

The furnaces are fired with fuel oil, the input rate being 650 gal./hr. during melting down and 500 to 550 gal./hr. during the remainder of the process. During the melting-down period oxygen is added at the burner to aid combustion and when the bath carbon is about 0.45 per cent. oxygen is injected into the bath for about 50 min. for carbon removal. Fuel consumption averages 3,587,000 B.t.u./ton of ingots.

In addition to usual instrumentation, 11 furnaces have steam-fuel ratio and fuel-air ratio control and automatic reversal equipment. Immersion pyrometers serve all furnaces and two furnaces have continuous oxygen analysers. Furnace performance figures average about 10 hr. charge-to-tap and 11 hr. tap-to-tap, giving approximately 18 ton/hr. Heats average 175 tons from the small furnaces and 205 tons from the larger and the slag averages about 18 per cent. of the ingot weight. The steel is poured into a larger variety of slab moulds of big-end-down and big-end-up types than at No. 1 shop. There are six pouring platforms.

No. 3 shop has seven 320-ton furnaces, four being built in 1952 and the others in 1957; their

CHARGING-FLOOR SIDE OF NO. 3 OPEN-HEARTH SHOP.

TABLE 6.—*Open-hearth Data.*

Shop No.	1	2	3
Furnace size, tons	108	170 | 200	320
Length inside buckstays, ft.-in.	(4) 56–0; (8) 60–0	68–0 | 70–1	91–0
Width inside buckstays, ft.-in.	17–3	19–9 | 22–0	25–7
Hearth length, ft.-in.	33–6	43–6¼ | 44–6	(3) 63–7½; (4) 66–0
Hearth width, ft.-in.	13–3	15–0¾ | 17–0	(3) 18–6; (4) 15–10
Hearth area, sq. ft.	523	769 | 803	1,248
Sq. ft. of hearth per ton	4.84	4.52 | 4.01	3.90
Front wall height, foreplate to skew, ft.-in.	4–10	5–8	5–1½
Number of charging doors	(1) 5; (11) 3	5	(3) 5; (4) 7
Back wall	Sloping (4); straight (8)	Sloping	Sloping
Height, foreplate to skew, ft.-in.	4–5	4–6	5–1½
Roof	18-in. silica with 20-in. ribs	16-in. silica with 20-in. ribs	(6) 18-in. silica with 22½-in. ribs; (1) 12-in. basic with 15-in. ribs
Roof span, ft.-in.	(4) 17–3; (8) 13–3	22–8¾	23–3¾
Roof rise, in.	22	34	(6) 42; (1) 52
Roof length between knuckles, ft.-in.	31–9 to 35–9	45–0	(3) 58–10; (4) 68–0¾
Height, foreplate to roof at centre, ft.-in.	6–4	7–11	9–1½
Downtakes	(11) Double	Single	(3) Double
Dimensions, ft.-in.	5–0 × 4–8 and 5–4	16–9 × 3–8	6–3 × 8–8
Area, each end, sq. ft.	50 (1) Single 14–3 × 3–0 42.75	61.4 —	108 (4) Single 18–6 × 3–9 69.4
Slag pockets, length, ft.-in.	14–3	20–0	21–4½
Slag pockets, width, ft.-in.	(4) 11–2; (8) 12–3	14–5	18–5
Regenerators	(8) double, 17 ft. 6 in. long × 22 ft. 3 in. wide × 14 ft.3 in. deep (4) single, 19 ft. long × 22 ft. 6 in. wide × 14 ft. 3 in. deep	Single, 25 ft. 3 in. long × 24 ft. 1 in. wide × 22 ft. 3 in. deep	Single, (1) one-pass, 30 ft. long × 25 ft. wide × 27 ft. (6) two-pass, 30 ft. to 41 ft. 6 in. long × 25 ft. wide × 27 ft. high

dimensions are given in Table 6, column 3. They have sprung silica roofs with zebra pattern front and back. Basic end panels and wing walls are in basic brick and three furnaces have suspended basic port roofs. It will be noted from Table 6, column 3, that six furnaces have two-pass generators. The steels produced are rimmed, semi-killed, and killed, mostly in lower carbon ranges. The hot-metal-to-scrap ratio for this plant is about 60:40.

The furnaces are fired by oil. Oxygen is not used for flame enrichment, but only for carbon removal by injection into the bath. Fuel consumption averages 3,100,000 B.t.u./ton of ingots. Each furnace is completely instrumented, having, in addition to the conventional equipment, automatic reversal, fuel-air ratio control, steam-fuel ratio control, furnace pressure regulation, roof temperature control, bath temperature recorder, and oxygen flow recorder. Furnace performance figures average about 9 hr. charge-to-tap and 10.0 hr. tap-to-tap, giving output rate of 32 ton/hr. The heats average 321 tons steel and slag make equals about 12 per cent. of the ingot weight.

The steel is poured into big-end-down moulds of 30 in. by 48 in. by 80 in.; 30⅝ in. by 54 in. by 90 in.; 30 in. by 65 in. by 80 in.; 30 in. by 79 in. by 80 in.; bottle-top moulds of 27⅞ in. by 57 in. by 90 in.

Blooming and Billet Mills—No. 1 Plant

The mills in plant No. 1 are among the oldest in the plant and include a 36-in. blooming mill (No. 1) with a 24-in. three-high billet mill and a 19-in. continuous billet mill, a 24-in. bar mill, and a 100-in. sheared plate mill. Some details of the No. 1 bloomer and its soaking pits, ingot and product sizes, and rolling rates, are given in Table 7.

When the 36-in. mill is rolling slabs, product is pushed from the table just beyond the shear onto skids and then removed by crane. Blooms may follow several paths. They can move straight ahead to the three-high billet mill, they can move through this idle mill to a transfer leading to an adjacent billet yard serving the 24-in. bar mill, they can follow the blooming mill line still farther to a pusher and cradle, or they can be moved over a 100-ft. transfer following the blooming mill shear to a parallel mill line containing the 19-in. continuous billet mill.

24-in. Billet Mill.—This 3-high stand is located about 320 ft. from and in line with the blooming mill. It is approximately 200 ft. from the shear. Blooms to be rolled on this mill are 7 in. by 6 in., 75 to 76 ft. long. They are reduced to 4, 4½, 5, 5½, and 6-in. squares or 5 in. by 4 in. billets. The mill rolls at an average rate of 110 ton/hr., but can turn out 1,200 tons or more per 8-hr. turn. Product from this mill goes to a 600-ton shear capable of cutting sections up to 6 in. by 6 in., located about 200 ft. from the mill. The billets then pass over a hot bed 18 ft. wide by 26 ft. 8 in. long to storage. They are then moved by rail, principally to the 14-in. merchant mill.

19-in. Billet Mill.—This continuous mill lies in a line paralleling the blooming mill line and about 23 ft. to the right. A 100-ft. transfer connects the two lines. The mill, which was put into operation in 1927, consists of eight 2-high stands and four vertical edgers. The first two horizontal stands are 24-in. units; the rest are 19 in. This mill rolls 7 in. by 6 in. billets, 77 ft. long, into 3½, 3, 2⅝, 2½, 2¼, 2 and 1¾ in. squares at an average rate of 110 ton/hr. The mill has rolled 1,257 tons per 8-hr. turn. This mill and the 3-high mill have combined to roll 1,415 tons in an 8-hr. turn. Product from the continuous mill continues over the runout table and is moved off by a skew table

to a 107-ft. by 30-ft. cooling bed. Most of the product goes to the 10-in. merchant mill for re-rolling.

24-in. Bar Mill

Originally installed in 1908, the 24-in. bar mill is one of the older units of the plant. It is located adjacent to the No. 1 blooming mill in plant No. 1 and gets most of its blooms from that mill. The steel is heated in two continuous furnaces with hearths 44 ft. 10½ in. long by 13 ft. wide. The mill itself consists of four 2-high stands, side by side. No. 1 stand is a universal mill, with 24 by 44 in. horizontal rolls and four vertical rolls 15⅞ in. by 20¼ in. This stand acts as a rougher when rolling universal plate, with No. 2 stand putting on two finishing passes. In this case, No. 1 motor drives No. 1 stand and No. 2 motor drives No. 2 stand through the idling Nos. 3 and 4 stands. The rolls in Nos. 2, 3, and 4 stands are 25 by 60 in.

This mill receives blooms ranging 4 in to 7in. square by 7 ft. to 12 ft. 4 in. long and 380 to 2,060 lb. in weight, and slabs 5 to 27 in. wide by 3 to 8 in. thick. It reduces them into squares from 2 to 5 in., rounds 3 to 5 in. dia., angles from 5 in. by 3 in. to 6 in. by 6 in., channels 6 to 13 in., I-beams 5 to 7 in., Z-bars 4 to 5 in. and many special shapes, or to universal plate ¼ to 4 in. thick and 6 to 26½ in. wide. The mill produces at an average rate of 45 ton/hr. and has set records of 816 ton/8-hr. turn, 1,930 ton/day, and 28,000 ton/month.

100-IN. PLATE MILL, NO. 1 STAND, 3-HIGH MILL, DELIVERY SIDE.

Sheared Plate Mill

The sheared plate mill was one of the early installations in plant No. 1, beginning operation in 1913 as a 90-in. mill. It has since been widened three times to the present 108 in. This mill receives slabs from all four blooming mills in the plant. Slabs range from 30 to 50 in. in width and 3 to 9¼ in. thick. They are heated in a continuous, triple-fired, recuperative unit 20 ft. wide by 56 ft. long overall fired with coke-oven gas or fuel oil. Heating time averages about 1½ hr. Fuel consumption runs 2,800,000 B.t.u./ton of slabs heated.

The heated slab proceeds to the mill, a single stand 3-high unit. Mill rolls have a body length of 108 in., with top and bottom rolls 35½ in. dia., the middle roll 22½ in. dia. The slab is descaled during rolling by hydraulic sprays of 1,000 lb./sq. in. pressure located top and bottom on the entry side, and on top on the exit side.

Product from this mill runs from ⅜ to 3 in. in thickness, and up to 84 in. wide for ⅛-in. plate; 96 in. wide for heavier material. The mill averages about 41 ton/hr., but has set records of 89.2 ton/hr., 653 ton/hr/8-hr. turn and 29,377 tons in a month.

Blooming Mills—No. 2 Plant

Three additional blooming mills (Nos. 2, 3, and 4) are installed in No. 2 plant. Some details of these units are included in Table 7. The product of No. 4 is entirely for the strip mill. No. 2 bloomer is located adjacent to No. 2 open-hearth shop. It is a 46-in. 2-high reversing mill put into operation in 1953, replacing an old 40-in. unit.

An automatic scarfing machine, placed 110 ft. from the mill, can scarf top and bottom and both edges of the slab and blooms as desired. It will remove 1/32 to ½ in. of surface metal, and operates at 65 to 195 ft./min. The blooming mill shear, located 90 ft. beyond the scarfer, will cut 600 sq. in. of hot steel.

No. 2 bloomer is lubricated by three circulating oil systems and three grease systems. Data on rolling rates, and ingot and product sizes are shown in Table 7. Product from this mill consists of slabs, blooms, and shape blanks.

No. 3 blooming mill was put into operation in 1936, primarily to roll slabs for the 76-in. strip mill. It is located between the furnace ends of the 76- and 44-in. hot-strip mills, and almost in line with them. Details of this mill are listed in Table 7. It is a 2-high 46 by 100 in. high-lift, reversing slabbing mill.

An automatic scarfing machine, which can condition the four surfaces of slabs as desired, is installed 86 ft. from the mill. The 1,200-ton down-cut slab shear, placed 43 ft. 4 in. beyond the scarfer, can cut slabs 51 in. wide in thicknesses up to 9¼ in. maximum. Product from No. 3 bloomer is almost entirely slabs for the hot-strip mills. Product and ingot sizes and rolling rates are given in Table 7. The mill rolls 29 to 35 ingots per hour, depending on their size.

No. 4 slabbing mill went into operation in 1958. Some details about it are given in Table 7. It is

TABLE 7.—*Blooming Mills.*

Mill No.	1.	2.	3.	4.
Year completed	1905—Rebuilt 1935	1953	1936	1958
Size, in.	36	46	46	46 × 90
Type	2-high reversing	2-high reversing	2-high reversing	Reversing—universal
Housing, post area, sq. in.	375	600	520	750
Roll dia., in.	32	44 max.	43½	45
Roll body length, in.	74	100	100	90
Kind of rolls	Alloy steel	Alloy steel	Alloy steel	Alloy steel
Type of roll balance	Hydraulic	Hydraulic	Mechanical counter-weight	Mechanical counter-weight
Maximum roll lift, in.	36	61½	53	84
Roll lift speed, in. per min.	250	480	325	600
Main drive, h.p.	7,000	6,500	7,000	(2) 6,000
Main drive, voltage	700	650	700	750
Main drive, r.p.m.	0/120	0/120	0/50/120	0/40/80
Operating torque, lb.-ft.	1,250,000	1,250,000	1,650,000	1,600,000
Any descaling on mill?	None	None	None	None
Mill scale disposal	Manually	Sluiced to sump	Sluiced to sump	Sluiced to sump
Shear, type	Downcut with depressing table	Downcut with depressing table	1,200 ton down-cut	1,875 ton down-up cut
Shear location	122 ft. from mill	200 ft. from mill	133 ft. 5½ in. from mill	211 ft.-6½ in. from mill
Maximum size cut, in.	9½ × 9½; 32 × 6½	600 sq. in.	900 sq. in.	900 sq. in.
Shear control	Magnetic	Adjustable voltage	Adjustable voltage	Adjustable voltage
Crop disposal	Dropped into box	Chuted to hoist	Chuted to conveyor	Chuted into car
Ingot sizes, in.	22½ × 24½, 9,600 lb. to 26 × 36, 17,000 lb.	27¾ × 27¾, 12,000 lb. to 30 × 62½, 34,000 lb.	26 × 36, 17,000 lb to 30 × 54, 28,400 lb.	26 × 36, 17,000 lb to 30 × 79, 41,000 lb.
Product sizes, in.	Blooms 5 × 5 to 9½ × 9½ Slabs 6¼ × 4 to 32 × 6½	Blooms 7 × 6 to 12¾ × 12¾ Slabs 19 × 3½ to 59 × 12¾	Slabs 18 × 3 to 51 × 6½ Blooms 6 × 6 to 10 × 9	Slabs 18 × 3 to 76 × 10
Average hourly rolling	130	159	292	390
Rolling speed, max., ft./min.	920	1,392	1,370	940
Scarfer	None	110 ft. from mill	86 ft. from mill	137 ft. 2 in. from mill
SOAKING PITS.				
Number	10	22	26	18
Type	Reversing regenerative	(6) Recuperative, (16) regenerative	(14) Circular; (12) one-way	One way, top fired
Length, ft.-in.	(8) 11-2; (2) 12-0	(6) 20-0; (4) 18-0; (12) 13-0	(12) 21-0; (14) 16-0 dia.	22-0
Width, ft.-in.	(6) 11-6; (2) 10-2½; (2) 10-8¼	(6) 18-0; (4) 13-0; (12) 7-0	(12) 8-6	8-6
Depth, ft.-in.	9-6	(6) 12-0; (4) 9-0; (12) 8-0	(12) 13-6	13-6
Total hearth area, sq. ft.	1,206	4,188	—	3,366
Kind of fuel	Mixed coke-oven and blast-furnace gas	Mixed coke-oven and blast-furnace gas	Coke-oven gas and oil	Coke-oven gas and oil
Controls	Fuel-air ratio, furnace pressure, temperature	Fuel-air ratio, furnace pressure, temperature	(26) Furnace pressure; (26) Temperature; (12) Fuel-air ratio	Fuel-air ratio, temperature furnace pressure
Temp. of charged ingots, C.	650	760	760	875
Average heating time	2 to 4 hr.	3 to 8 hr.	4 to 6 hr.	4½ to 6
Average B.t.u.-ton	1,420,000	1,400,000	1,250,000	1,250,000

located adjacent to the 44-in. hot-strip mill and its product goes into a slab area adjacent to the hot-strip slab yards. The mill itself is a 46-in. by 90-in. 2-high universal mill having slabbing stand followed on 8-ft. 1-in. centres by an attached vertical edger.

The mill can operate entirely automatically. Its adjustable-voltage controlled auxiliaries all operate with static switching under programmed control using punched cards. Only one man is in the pulpit.

Structural Mill

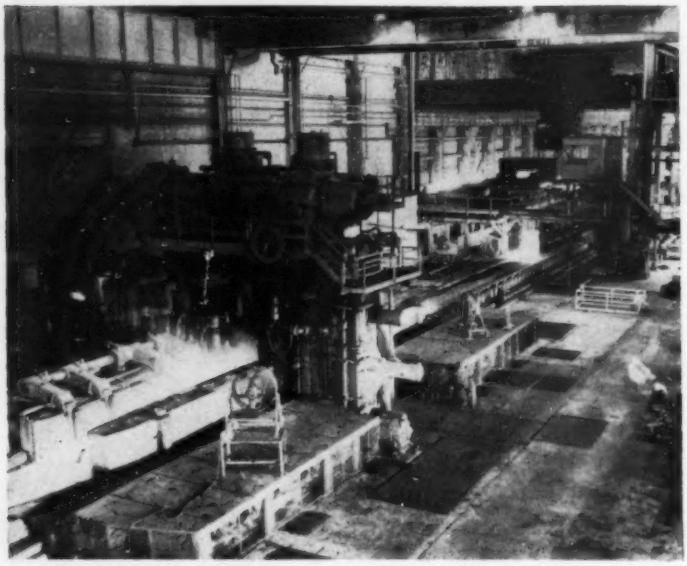
The structural mill was originally built in 1916 as a 28-in. unit, but has been modified over the years. In 1955 a 44- and a 40-in. universal stand were incorporated to broaden the product range to include wide-flange beams. The mill is a Belgian layout, with a 32-in. 2-high reversing rougher, followed by three 28-in. stands side by side. When rolling standard structural shapes, the bloom might receive five passes in the 32-in. rougher, two, three, or four passes in the 3-high 28-in. rougher, two, three, or four passes in the 3-high 28-in. intermediate stand and a final pass in the 2-high 28-in. finisher.

As modified for wide-flange beams, rolls are changed in the 32-in. stand, the 28-in. rougher is replaced by another 28-in. stand made up with rolls for the new section, the 28-in. intermediate stand is removed, and the 28-in. finishing stand is replaced by a 44-in. universal stand which fits on the 28-in. stand shoes, followed closely by a 34-in. edging stand. In addition, a small section of table rolls is removed and a 40-in. universal finishing stand is set in. The beam blank may receive five passes in the 32-in. rougher, one or three passes in the 28-in. rougher, three, five, or seven passes in the 44-in. stand and the edger stand, and a final pass in the 40-in. stand.

The mill receives blooms ranging from 7 by 6 in. up to 14 by 11 in. and beam blanks up to 29 by 18 in. in lengths of 8 to 16 ft. 10 in. It produces angles from 6 by 3½ in. to 8 by 8 in.; channels from 10 to 15 in.; I-beams from 7 to 24 in.; Z-bars 12⅞ in.; squares from 2 to 6 in.; rounds from 3½ to 5 in.; sheet piling, and various special sections. Rolling rates average 72 ton/hr., but the mill has set records of 170 ton/hr., 1,228 ton/8-hr. turn, 3,375 ton/day, and 54,541 ton/month.

Merchant Mills

Two merchant mills are installed in plant No. 2. They lie side by side, adjacent to the structural



NEW SLABBING, 46-IN. BY 90-IN., 2-HIGH UNIVERSAL MILL.

mill. One is a 10-in. unit, the other 14 in. Together they provide a wide range of bars and small structural shapes. The 10-in. bar mill is a 15-stand continuous which was put into operation in 1930. It consists of seven 14-in. roughers, three 12-in. intermediate stands, three vertical stands, and two 10-in. finishers, all in line. Billets come to the mill chiefly from the 19-in. billet mill in plant No. 1 by rail. They range from $1\frac{1}{4}$ to 3-in. square or slabs up to $4\frac{5}{8}$ in. wide, 27 to 30 ft. in length. Weight runs from 320 to 930 lb. in weight. The billets are heated in a single continuous sidecharge, side-discharge furnace with a 45- by 33-ft. hearth, fired with coke-oven gas or oil under manual control.

Nos. 10, 12, and 14 stands of the mill are vertical edgers. The other 12 are 2-high. Nos. 2 and 3 stands share a common drive motor, as do Nos. 4 and 5 stands. The other stands are individually driven.

The 10-in. mill rolls at an average rate of 40 ton/hr. It has established records of 777 ton/8-hr. turn, 2,008 ton/day, and 35,743 ton/month. The 14-in. mill, first started in 1923, is a 10-stand layout, with six roughers in a continuous train followed by four 14-in. stands arranged in a cross-country double-duo. Steel is furnished to the mill principally by the 24-in. billet mill in plant No. 1, with some also coming directly from No. 1 blooming mill and from the 28-in. structural mill. The billets may range from $3\frac{1}{2}$ to 6 in., 8 to 14 ft. long. A typical billet is 5 in. square by 12 ft. long, weighing 1,000 lb.

The 14-in. mill product includes $1\frac{1}{2}$ to 4-in. angles, 3 and 4-in. beams, 3 to 5-in. channels, 3-in. Z-bars, $\frac{7}{8}$ to $3\frac{1}{16}$-in. rounds, $\frac{7}{8}$ to 2 in. squares, $1\frac{7}{16}$ to $3\frac{1}{16}$-in. hexagons, and flats $\frac{1}{4}$ to $2\frac{1}{2}$ in. thick by $1\frac{1}{2}$ to $6\frac{1}{2}$ in. wide. Some special shapes are also produced. Average rolling rate is 38 ton/hr., with established maximum of 710 ton/8-hr. turn, 1,824 ton/day and 29,268 ton/month.

Hot-strip Mills

Inland installed a 76-in. continuous wide strip mill in 1932. This unit was one of the first laid out in the basic pattern which was followed by subsequent installations throughout the industry. This was followed in 1938 by a second mill, a 44-in. continuous unit to complement the products from the 76-in. mill.

Both mills lie in line with their roughing ends toward each other with No. 3 blooming mill between them. No. 4 slabber is also nearby and

DELIVERY END OF 76-IN. CONTINUOUS HOT-STRIP MILL WITH 46-IN. BLOOMING MILL IN THE BACKGROUND.

its product goes to a common slab yard that serves both strip mills.

76-in. Mill.—Slabs for the 76 in. may range 18 to 75 in. wide, 4½ to 6½ in. thick, and 68 to 192 in. long. A typical average is 52 by 5¼ by 130 in. Slab weight averages 12,000 lb. in a range of 3,000 to 17,500 lb. The three heating furnaces are of triple-fired design, 100 ft. long overall, and rated at 110 ton/hr. Hearths are 18 ft. wide and 92 ft. long, of which 20 ft. is a solid hearth soaking zone. The furnaces are fired with coke-oven gas and fuel oil. Heated slabs, expelled from the slab furnace slide down discharge skids to the furnace table, and to the broadside stand.

On each side of the broadside stand there is a turntable which can be used to turn the slab through 90 deg. for cross rolling to increase width and then return it to its original axis. A slab pusher ahead of the broadside stand assists in entering the slab between the rolls. Following the broadside stand is a slab squeezer to square up the slab edges. The slab then proceeds to the three remaining roughers and through No. 2 scale breaker. These roughers are equipped with integral edging rolls on their entry sides.

Preceding the six-stand finishing train is a crop shear for squaring up the ends of the breakdown if desired. Between the finishing stands are loopers to take up slack in the strip between successive stands.

The 76-in. mill can produce No. 16 gauge material in width of 30 to 60 in., No. 14 gauge up to 66 in. wide, and No. 12 gauge and heavier up to 72 in. wide. About 46 per cent. of its product goes to hot-rolled finished product, 56 per cent. to cold-rolled or galvanized product. The mill averages 225 ton/hr., but has rolled as much as 2,835 ton/8-hr. turn, 6,197 ton/day and 153,000 ton/month.

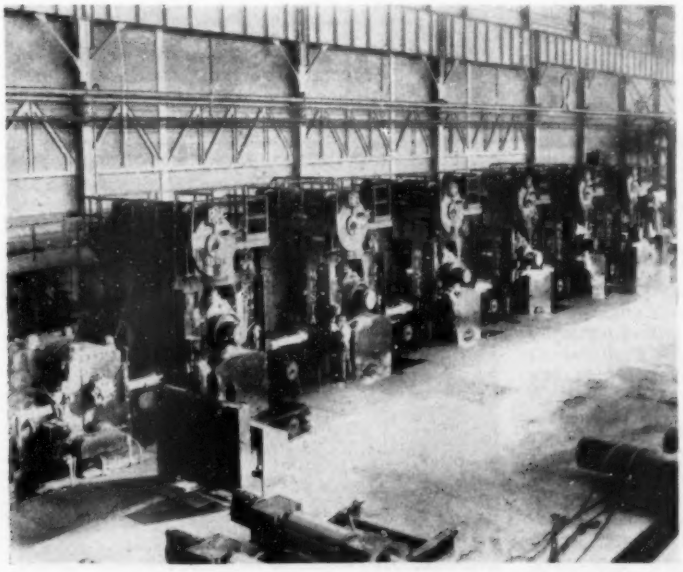
Equipment for finishing hot-rolled flat products is installed in the runout end of the hot-mill buildings. This includes a 72-in. rotary shear, two 2-high skin pass mills for sheet, three side-and-end shear units, a rotary slitter, two resquaring shears, and a leveller.

44-in. Mill.—In general, the 44-in. mill rolls lighter gauges than the 76-in. mill, and, of course, narrower. This mill rolls No. 18 gauge in widths of 18 to 38 in. and heavier gauges in 18 to 41 in. widths. No. 12 gauge and heavier is rolled in 9 to 41 in. widths. The average product gauge is 0.103 in. Slabs for this unit average about 34 by 5 by 175 in., but may range from 9 to 43 in. in width, 4½ to 6½ in. in thickness and 68 to 192 in. in length. Weights run 2,000 to 14,000 lb., averaging about 9,000 lb.

The 44-in. mill train consists of first scalebreaker, four roughers, second scalebreaker, and six finishing stands. The roughing scale breaker is a vertical edger. The first rougher is a 2-high stand. There is no broadside stand, as slab spreading is unnecessary on the narrow mill. Hence, there are no turntables or slab squeezer. The delay table between roughing and finishing trains is somewhat longer than in the 76-in. mill. Nos. 2, 3, and 4 roughers are of universal type, with vertical edger rolls 22 in. dia. on the entry side, integral with the mill stand. Loopers between successive finishing stands take up strip slack.

The 44-in. mill averages about 240 ton/hr. Approximately 28 per cent. of the product goes into hot-rolled finished, 52 per cent. into full finished, and 20 per cent. into tinplate.

The 44-in. mill has set records of 2,673 ton/hr. turn, 7,088 ton/day, and 158,284 ton/month.



SIX FINISHING STANDS AND FLYING SHEAR ON 44-IN. HOT-STRIP MILL.

Hot-finishing Plant

Hot-finishing equipment provided in the 44-in. mill building includes a 26 by 56-in. skin pass mill driven by a 250-h.p. d.c. motor, two 48-in. side trimming, levelling, and cut-up lines, and three circle shears. In another hot-finishing department nearby there is a 27 by 60-in. skin pass mill driven by a 175-h.p. motor, a batch pickler with scrubber and dryer, and two cut-up lines. There is also a gas-fired continuous normalizing furnace 9 ft. wide by 106 ft. long.

Strip and Sheet Finishing

Strip and sheet material is cold finished in several separate areas. No. 1 and No. 2 cold mills and the tinplate department are adjacent and lie to the west of the hot-strip mills. They contain three continuous pickling lines, a 72, a 54, and a 42-in. tandem cold mill, a reversing cold mill, cleaning and annealing facilities, temper mills, tinning equipment, and shearing lines. No. 3 cold mill is located on the east side of the hot mills and contains a pickling line, a 56-in. tandem cold reduction mill, annealing furnaces, a 56-in. temper mill, shearing facilities, and a continuous normalizing line. All of the lines are of conventional design, with four acid solution tanks, followed by a rinse tank, a scrubber, dryer, and a recoiler. Pickling solutions contain from 6 to 16 per cent. sulphuric acid in the various tanks, and are maintained at 95 to 100 deg. C. by steam under automatic control. Coils are butt-welded together to form a continuous strand. Table 8 gives some details of the four pickling lines.

TABLE 8.—*Continuous Pickling Lines.*

Number	1	2	3	4*
Nominal size, in.	74	74	60	63
Overall length, ft.	630	630	715	780
Number of pickling tanks	4	4	4	4
Tank length, ft.	(3) 70; (1) 60	(3) 70; (1) 60	80	(2) 85–6; (2) 84
Tank width, ft.-in.	9·4	9·4	8·2	9·11
Tank depth, ft.-in.	5·2	5·2	5·2	6·7
Tank capacity gal. each	(3) 12,240 (1) 10,440	(3) 12,240 (1) 10,440	12,168	37,800
Speed range, f.p.m.	150/350	150/350	150/400	800 max.
Capacity ton/month	148,500	148,500	148,500	45,000

* At No. 3 cold mill.

Coil annealing is done in 25 portable cover, radiant-tube furnaces with 75 bases. These furnaces provide a monthly capacity for 70,000 tons. Three 50,000 cu. ft./hr. gas machines provide protective atmosphere during annealing.

Additional batch annealing capacity for 45,000 ton/month is provided in the No. 3 cold mill. This installation consists of 12 four-stack covers 36 ft. 10 in. long by 10 ft. 4 in. wide, and four single-stack covers 11 ft. 2 in. dia. Protective atmosphere for these furnaces is supplied by four gas-generating machines, each of 20,000 cu. ft./hr. capacity. A 400-ft. gas-electric normalizing furnace is also installed in No. 3 cold mill. The furnace operates at speeds up to 125 f.p.m. and has a capacity of 360 ton/day. After annealing, sheet material may be given a skin pass in one of two sheet temper mills.

Tinplate Department

Stock for tinplate is cold rolled principally on the 42-in. tandem mill in coils built up at the pickler to a maximum of 30,000 lb. After cold rolling, this material is either put through a continuous annealing line in which is incorporated an alkaline cleaning unit, or it is put through a continuous electrolytic cleaning line and subsequently batch annealed. The continuous annealing line is a 38-in. unit, 266 ft. in overall length. The cleaning section of the line subjects the strip to a 90 deg. C. caustic solution.

The strip is next washed and dried, and then fed in vertical passes through a preheating zone and a gas-fired furnace. Strip next passes through a soaking zone (650 to 485 deg. C.) and a water-cooled zone which reduces strip temperature to about 290 deg. C. Protective atmosphere is provided for the soaking and cooling zones.

The strip is finally quenched with water, dried, and recoiled.

This line operates at speeds of 500 to 850 ft./min., and processes material 18 to 36 in. wide and 0.007 to 0.018 in. in gauge. Production averages 21.7 ton/hr.

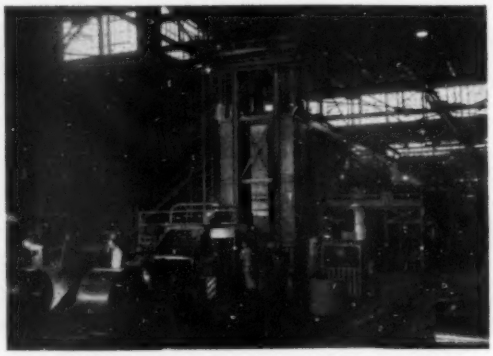
Electrolytic tinplate is produced by two continuous lines. They are of the alkaline type. Each line contains payoff reels, crop shear, welder, looping tower, side trimmer, contact micrometer, pickling section, plating tank, rinse tank, fusion furnace, quench tank, chemical treatment unit, oiler, pinhole detector, shear, and classifier.

No. 1 plating line handles strip in gauges ranging 0.007 to 0.0145 in., with widths averaging about 30 in. Coils run up to 15,000 lb. maximum weight. With a speed range of 400/750 ft./min., this line generally operates at about 600 ft./min. with 65,000-amp. plating current for 0.25 lb. coating. Production averages 17.7 ton/hr.

No. 2 line can process the same gauges. It operates at approximately 750 ft./min. with a plating current of 120,000 amp. for 0.25-lb. coating. Overall speed range is 400/900 ft./min. Production averages 20 ton/hr. The two lines provide capacity for 22,607 tons of tinplate per month.

Galvanizing Department

Galvanizing facilities, which are located in plant No. 1, consist of three continuous lines. Table 9 gives some details of the three lines, which are basically similar in design and operation. Coating weights may range from 0.5 to 3.0 oz./sq. ft. of strip surface Departmental capacity is about 30,000 ton/month.



ENTRY END OF ELECTROLYTIC TINPLATE LINER.

TABLE 9—*Galvanizing Lines.*

Year installed	1951	1954	1955
Overall length, ft.-in.	888–6¼	887–3⅜	1,035–10⅞
Length, oxidizing furnace, ft.	20	20	30
Length, reducing furnace, ft.	104	104	121
Length, controlled cooling zone, ft.	224	224	261
Length, final cooling zone, ft.	55	55	72
Gauges handled	12/30	8/30	14/30
Widths handled, in.	24/48	24/48	24/60
Maximum coil weights entering, lb.	30,000	30,000	40,000
Maximum coil weights leaving, lb.	15,000	15,000	15,000
Maximum strip speed, ft./min.	225	225	300
Ton/hr.	9.5	16.0	20.0

Quality Control

Quality control is a function on which some 575 people work. A customer service department processes all incoming orders, reviewing the application of the steel ordered and specifying the procedure to be used in making and handling the steel. This department also acts as sales liaison in customer contacts.

The chemical department, in a main laboratory and auxiliary laboratories in plants Nos. 1, 2, and 3 and at the tin mill, runs some 2,000,000 analyses a year for the various production processes. Three spectrographs provide rapid service for the open-hearth departments.

The metallurgical department watches over all steps in production procedure. Inspectors at the open hearths oversee the actual steelmaking processes. Observers check primary and finish rolling to insure adherence to outlined practice. Inspectors look over all finished products for surface quality and tolerance limits. The main metallurgical laboratory is equipped to run metallographic and physical tests, including effects of heat treatment, etc. Auxiliary testing stations are provided in the various producing areas of the plant.

Utilities and Services

The electric power system for the plant is in two sections—a 25-cycle section and a 60-cycle section. The 25-cycle power is supplied entirely by generation within the plant. This system has a total generating capacity of 150,500 kW, divided between three stations. The total plant system sets up an average load of 150,100 kW. Plant consumption totals about 96,000,000 kW hr./month. Steam for all plant usage is produced in eight boilerhouses containing 79 units, having capacities (lb. of steam/hr.) totalling 4,313,000.

Inland uses waste heat for steam generation to an unusual degree, obtaining approximately 1,000,000 lb. of steam per hr. from this source.

Lake Michigan is the source of water for Inland's plant. The principal entry is a forebay on the east shore of the plant, maintained 3 ft. to 5 ft. above the lake level by eight 100,000 gal./min. 7.5-ft. head pumps, each driven by a 300-h.p., 2,300-volt motor. These pumps were necessitated by periods of low lake level. Electric screens are installed at the entrance of the forebay to repel fish. Three intakes on this forebay normally supply the plant's requirements.

Total installed pumping capacity is 488,000 gal./min. on circulating water, 511,000 gal./min. on service water. Approximately 760,000,000 gal. of water are pumped from the lake each day. Total water treated per month for boilers runs about 1,000,000,000 lb. month.

Compressed air for plant No. 1 is supplied by seven compressors located in No. 3 pump house. Plant No. 3 is supplied from five compressors in No. 3 powerhouse. In plant No. 2, compressors are installed at six separate locations.

Maintenance is carried out on a departmental basis, backed by a complete layout of well-equipped shops centred chiefly in plant No. 1. Here are the machine, blacksmith, pattern, carpenter, locomotive, welding, boiler, fabricating, rigger, pipe, scale, and electric shops. A shop for repairing cars and mobile equipment is located in plant No. 2. Refractory maintenance is performed by a masonry department of 200 to 300 men. The plant contains somewhat more than 100 miles of railroad track. Locomotives, numbering 52, mostly diesel, are despatched by radio from yardmasters' offices. Mill rolls for the entire plant are designed and conditioned in five roll shops, all located in plant No. 2. In a typical month the roll department conditions about 1,100 shape mill rolls and 8,000 strip mill rolls.

Inland was a pioneer in the safety movement and considers safety a primary responsibility throughout its operations. Among extensive programmes conducted by the safety and plant protection department are first-aid training, gas protection training, and firefighting techniques. Departmental supervisers also carry on safety education and hold regular safety meetings. Well-equipped hospital and ambulance facilities are available.

Chicago Heights Plant

The seed from which Inland sprouted, the original plant at Chicago Heights, Ill., is still a producing unit of the company. As now constituted, the rolling mill is a Belgian cross-country combination devoted principally to re-rolling steel rails.

The products include angles from ¾ by ¾ in. to 3 by 2 in., rounds and squares from ½ to 1¼ in., flats from ¼ by ¼ in. to 2½ by ⅝ in., bands from No. 12 gauge by 1 in. to ⅞ by 3 in., and special shapes, fence posts, tees, U-bars, channels, and bevel blades. The mill averages about 21 ton/hr., but has produced as much as 310 ton/8-hr. turn.

Recent Plant Installations

According to a recent announcement by Joseph L. Block, chairman of the Inland Steel Company, the following items of modern plant have recently been put into operation at the Indiana Harbor Works:—

(1) A fourth continuous galvanizing line which gives Inland the biggest, continuous capacity under one roof in the steel industry. It increases present capacity by 120,000 tons a year. Supplementary equipment will enable Inland to make aluminium sheets on this line for the first time.

(2) Equipment for production of tinplates in coils, and "thin tin," a material roughly half the thickness of conventional tinplate. This will compete with aluminium sheet for making certain types

of cans which do not require the strength supplied by full weight tinplate. The thin tinplate is being used for cans for beer and oil.

(3) A sintering plant, estimated to have added 300,000 tons a year, or 10 per cent., to the capacity of the company's eight blast furnaces.

(4) A mile-long coal conveyor system which has tripled coal unloading capacity of the works.

Acknowledgment is made to the Inland Steel Company and to the editor of the Iron and Steel Engineer for providing information and illustrations.

United Steel Group at Building Exhibition

UNIVERSAL beams and columns produced in the new universal beam mill at the Appleby-Frodingham Steel Company are being used for the steel framework of the United Steel Structural Company's stand at the Building Exhibition, to be held at Olympia, London, from November 15 to 29. A wide range of the sections rolled in this mill will be on display.

The stand structure will incorporate an example of a tapered Castella beam, and the exhibits will include an animated model showing how these economical, weight-saving beams are produced. Among the items on display will be high-strength friction bolts, which give greater strength than conventional rivetted joints and can be fitted in far less time. A scale model of the Jodrell Bank radio telescope, which was fabricated and erected by the United Steel Structural Company, and photographs of other recent interesting contracts completes this section of the display.

In a complementary exhibit, Samuel Fox & Company, Limited, is featuring the use of stainless steel in building, with particular reference to curtain walling construction.

Welding Technology Evening Courses

During the winter of this year and the spring of 1962 the School of Welding Technology will be offering evening courses on "Design for Welding in Steel Construction" in Birmingham (November-March), Bristol (January-March), and Leeds (January-March). There will also be a course on "Detail Design of Welded Structured Steelwork" in Manchester (January-March). Details may be obtained from the Institute of Welding, 54, Princes Gate, Exhibition Road, London, S.W.7.

Purchasing Officers' Stand Awards

First prize at the recent 1961 Minibition of the Purchasing Officers Association in the competition for the "Stand of Most Practical Value to Buyers" was awarded to C. Lindley & Company, Limited, bolt and nut manufacturers and engineers' merchants, of London, N.1, with Robertson, Thain, Limited, manufacturers of protected metal roofing and flooring, of Ellesmere Port (Ches), as the runners-up. The stand of Airguard, Limited, manufacturers of industrial protective equipment, of London, W.6, received special mention.

Safety in the Steelworks

IN any part of a steelworks, anywhere in Britain, and at any age, a worker is safer now than he was four years ago. This is the positive result of the change in the attitude towards accident prevention that has been achieved throughout the industry since 1956.

The British Iron and Steel Federation, in the autumn issue of Safety, its magazine of accident prevention and health, says: "Taking the evidence over a four-year period, section by section, district by district, the improvement is shown to be a very real one. No element of luck, no selection of figures, can produce the same result, and for so long, in every section of the industry and in every part of the country. It is the result of the realization that safety is not achieved by slogans, or orders, or by brief safety campaigns, but only by detailed study of the causes of accidents and by sustained effort to achieve working methods that eliminate those causes."

There are many articles and features in Safety designed to reduce our accident rate and to enable our steel industry to reach the desired target—"when we can say that, as far as is humanly possible, no *preventable* accident occurred," as the federation words it.

Common Market Would Intensify Special Steel Demand

TREND towards new and improved steels was accelerating under the influence of keen competition within the heavy engineering industry, said Dr. Leslie Reeve, chief metallurgist of the Appleby-Frodingham Steel Company (branch of the United Steel Companies, Limited), in his presidential address to the Lincolnshire Iron and Steel Institute at Scunthorpe on October 9.

"Export or die has become a bitter slogan in this country," he said. "If we enter the Common Market, the drive towards quality steels to meet special engineering requirements at economic prices will become even more intense."

Reviewing the changes and improvements made for industries such as shipbuilding, bridge building, earth moving equipment, and atomic energy, the speaker said the emphasis was on steel not only of a higher mechanical strength but increased toughness at low temperatures and improved properties at elevated temperatures.

THE US FIRM Rockwell-Standard, jointly with the Argentine firm Artimsa, is to set up a plant for the manufacture of springs for motor vehicles and railway wagons and coaches at Pacheco, in the province of Buenos Aires.

UTILIZATION OF

Coal and Coke in the US

REVIEW OF RECENT TRENDS

Competition from oil has had a considerable effect on the coal industry of Great Britain. In the US, where oil supplies are more readily available, the competition has reached a more advanced state. In a paper presented to the Institute of Fuel, Mr. Harry Perry and Mr. Carl C. Anderson, assistant chief, division of bituminous coal, and chief petroleum engineer, respectively, of the Bureau of Mines, US Department of the Interior, reviewed the trends in the coal and oil industries. The trends applying to the coal industry are given in the following extracts from the paper.

SIGNIFICANT coal deposits ranging in rank from anthracite to lignite occur in 27 States in the US. Several other States have minor deposits, now of limited commercial importance, and meta-anthracite is found in small quantities in Rhode Island.

Estimates of coal reserves are based mainly on surveys conducted by the individual states in co-operation with the Federal Geological Survey, and the limitations, such as those imposed with regard to the depth of coalbeds and thickness of seams, vary somewhat for each State. However, for the most part, reserves include coal under less than 3,000 ft. of cover and with a seam thickness of more than 12 in.

Vast Reserves of Coal

The reserves of all ranks of coal, except for meta-anthracite, are large, with almost 1,700,000 million tons of coal still remaining in the ground. Of this, about 47 per cent. is bituminous coal, more than 25 per cent. is lignite, approximately 26 per cent. is sub-bituminous coal, and a little less than 2 per cent. is anthracite. With minor exceptions, all the anthracite is found in a limited area in eastern Pennsylvania.

Over 95 per cent. of the lignite reserves occur in a single, almost continuous deposit in western North Dakota and eastern Montana, with about 80 per cent. of the total lignite reserves being found in North Dakota. Bituminous coal not only makes up the largest tonnage of the reserves, but is also more widely distributed, being found in important quantities in 22 States. The largest deposits occur in the Appalachian area and adjacent States, although Colarado, Utah, Kansas, Iowa, Wyoming, and Oklahoma also have important reserves.

In such a wide distribution of coal deposits, there is a great variation in the analysis of coal. Much of the coal is of very high quality; however, the average heating value in B.t.u. per lb. of the various ranks of coal being mined are:—Anthracite, 12,700; low-volatile bituminous, 14,200; medium-volatile bituminous, 14,000; high-volatile bituminous, 12,900; sub-bituminous, 9,550; and lignite, 7,000.

The thickness of the seams mined remained constant between 1920 and 1955, with over 75 per cent. of the seams mined being 3 to 7 ft. thick. Improvements in underground mining equipment and its more widespread use has resulted in a dramatic increase in productivity per man-day, from 5½ tons as recently as 1949 to 10 tons in 1959.

Effects of Competition

To survive the competition from other fuel sources, the American coal industry has made remarkable progress in improving mining conditions, equipment, and methods. By these means and in face of strong inflatory trends, the price at the mine has been kept essentially constant for more than 12 years. Increased mechanization has resulted in a steady decline in the number of miners employed, decreasing from over 441,000 in 1948 to under 180,000 in 1959.

Mechanization of mines requires large capital expenditure and only the larger ones have been able to justify and afford the new and more efficient equipment. Thus, between 1948 and 1959, mines with 500,000 tons or more production per year have increased their share of total production from 38 to 49.9 per cent. The importance of the larger mine is shown in that, in 1959, 212 mines (2.7 per cent. of the total) provided over 205,000,000 tons and 4,667 mines (60.5 per cent. of the total) provided less than 21,000,000 tons.

Dramatic shifts have taken place in the domestic coal market and Table 1 compares the situation in 1940 with 1959. Coal continues to be used primarily for the generation of heat and power and for the production of coke. The coke market has remained relatively constant during this period, but coal for the generation of heat and power has moved from wide use in small-scale equipment,

such as domestic and railroad applications, into the larger equipment normally found in utility and large industrial plants.

TABLE 1.—*Bituminous (including Lignite) Coal Markets* 1940 *and* 1959.

	1940.		1959.	
	Thousand tons.	Per cent. of total.	Thousand tons.	Per cent. of total.
Electric utilities ..	49,126	11.4	165,788	45.3
Bunker	2,989	0.7	969	0.3
Railroads	85,130	19.8	2,600	0.7
Coke plants	81,386	18.9	79,181	21.6
Steel and rolling mills	14,169	3.3	6,674	1.9
Cement mills	5,559	1.2	8,510	2.3
Other manufacturers	107,864	25.0	73,396	20.0
Retail deliveries ..	84,687	19.7	29,138	7.9
Total	430,910	100.0	366,256	100.0

The lowest average rate at generating stations for the consumption of coal was 0.89 lb. per kilowatt-hour and this figure was reached in 1959. New plant being installed, however, have even lower rates, and as older equipment is replaced further improvement is expected.

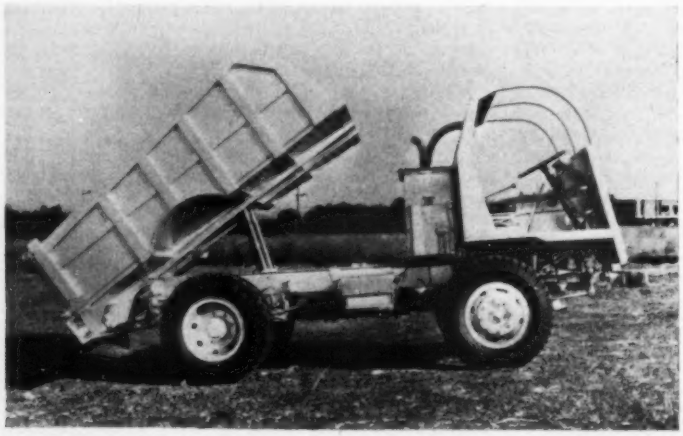
Coke production in the US in 1959 increased 4 per cent. over the previous year to 55,900,000 tons in spite of a 115-day shutdown of the iron and steel industry which forced a corresponding reduction in coke production. This coke was produced from 79,600,000 tons of coal, and over 98 per cent. was carbonized in slot-type ovens. Much larger amounts of beehive coke were produced than in 1958, and it appears that, under certain conditions, beehive ovens are economically attractive.

The smelting of iron ore in blast furnaces has shown increasing efficiency in the use of coke, and the coke rate or tons of coke per ton of pig-iron, has declined from about 0.95 in 1949 to less than 0.8 in 1959. This increase in fuel efficiency has occurred because of many technical improvements, including the use of pressurized domes, oxygen blast, more uniform ore charges, and sinterered ores.

Experiments are being conducted to investigate the results of adding natural gas, coke-oven gas, or oil to the air blast of the furnace. The use of these other fuels would reduce the coke rate even more.

UNDERGROUND TRANSPORT OF COAL BY LORRY

SPECIALLY adapted for use as an underground coal carrier, a tipping lorry chassis has been despatched to South Africa by Albion Motors, Limited, Glasgow, and it is now operating at Witbank Colliery. Based on a 94-h.p. diesel-engined Albion Chieftain chassis, the vehicle was reassembled underground after being transported down the mineshaft in two sections.



DIESEL-ENGINED ALBION CHIEFTAIN TIPPER SPECIALLY ADAPTED IN SOUTH AFRICA FOR CARRYING COAL UNDERGROUND.

Because of the vehicle's intermittent cycle of operations over a distance of about 200 yd., the constant-mesh gearbox has been replaced by a Brookhouse torque converter. A special dashboard has also been fitted on which warning lights have been included for easy recognition in the restricted underground lighting.

A special exhaust filter of the water-scrubbing type and an air cleaner are fitted to the engine. The latter is a Donaclone two-stage type and it is claimed that under adverse conditions ¼ lb. of dust has been collected from the detachable dust receiver after little more than an hour's engine operation.

The Chieftain is equipped with a special tipper body by the More-Wear Body Construction (Pty.), Limited, of Elandsfontein.

The tipper body accommodates wheel arches designed so that no coal stays behind the arches after tipping.

The body is tipped by twin Meiller rams, which are set very low in the chassis.

This has allowed the body to be mounted so that it can tip in less than 9 ft. 3 in. headroom.

NEW LITERATURE

REFERENCE is made below to some of the house magazines, catalogues, leaflets, and other publications received. Readers wishing to obtain a copy of any of the items should write direct to the address given, at the same time mentioning this journal.

BRITISH TIMKEN, Duston (Northants)—The whole of the section in the September issue of Timken Magazine devoted to the UK division of the Timken Roller Bearing Company is concerned with the 1961 British Timken Show.

FLUIDRIVE ENGINEERING COMPANY, LIMITED, Fluidrive Works, Worton Road, Isleworth (Middx)—The latest issues of Fluidrive News, for September and October, are concerned with Fluidrive for mixers and in chemical works, respectively.

SHEFFIELD CHAMBER OF COMMERCE AND MANUFACTURES (INC.), Cutler's Hall, Church Street, Sheffield 1—News of industry in Sheffield and district is well covered in the 80 pages of Quality of Sheffield (1s. 6d.), the September issue of which is now available.

REINFORCED CONCRETE ASSOCIATION, 94/98, Petty France, London, S.W.1—Most of the September number of the Reinforced Concrete Review (5s.) is concerned with contributions presented at the association's symposium on "Large-diameter Bored Piles," held in London on March 15 last.

EDGAR ALLEN & COMPANY, LIMITED, Imperial Steel Works, Sheffield 9—In addition to a number of articles continued from previous issues, the October issue of Edgar Allen News contains the statement by the chairman, Mr. W. H. Higginbotham, at the company's annual general meeting.

DELORO STELLITE, LIMITED, Stratton St. Margaret, Swindon (Wilts)—The use of "Stellite" to resist wear caused by heat, abrasion, and corrosion is the subject of an attractive brochure (A.1). A number of examples are given. Incidentally, the company has a school at Swindon where welders may be sent for tuition without charge.

DAVID BROWN TRACTORS, LIMITED, Meltham, Huddersfield—Third of a series of articles with the emphasis on craftsmanship appears in the October issue of Tractor News, a four-page news-sheet, the current article being "The Master Touch in Making Guns." The company's activities are skilfully presented in the form of stories and photographs in the paper.

CAMBRIDGE INSTRUMENT COMPANY, LIMITED, 13, Grosvenor Place, London, S.W.1—A series of leaflets detailing ranges of instruments made at the mechanical thermometer division and now available from stock has been issued. The instruments covered include dial type thermometers with vapour-pressure and mercury-in-steel systems, temperature regulators, draught and pressure indicators and recorders, and humidity instruments.

J. E. LESSER & SONS (HOLDINGS), LIMITED, Green Lane, Hounslow (Middx)—In addition to the parent company, the JEL group includes Middlesex Prefabricated Buildings, Limited, Glenhill (Office Furniture), Limited, Jeltek, Limited, and Recontainers, Limited. Products represented by the group include prefabricated buildings, protective clothing, jerricans, and office furniture. A new pamphlet, "More Facts About the JEL Group of Companies," outlines the activities of the group.

NATIONAL COAL BOARD, Hobart House, Grosvenor Place, London, S.W.1—October marks the fourth month of publication of Coal News (3d.), and there is every reason to believe that this is proving a successful venture. The insertion of four pages of local news and views in each of the nine editions means that readers are given an up-to-the-minute round-up of activities in their district, while the other four pages, common to all editions, are filled with brightly presented news stories and features.

ZINC DEVELOPMENT ASSOCIATION, 34, Berkeley Square, London, W.1—Discussion meetings held by the Iron and Steel Institute under the chairmanship of Dr. J. C. Hudson are reported in the corrosion section of the September issue of ZDA Abstracts. At one of the meetings, protection systems for structural steel and ship plate were discussed, and at another, Admiralty work on marine paints was reported. New applications of zinc anodes to refinery corrosion problems in the protection of oil storage tanks also exposed to acidic or saline solutions are described in another abstract in this section.

NATIONAL SOCIETY FOR CLEAN AIR, Field House, Breams Buildings, London, E.C.4—An article on "The Utilization of Waste Materials from Heat Production," by J. H. Smellie, Chief Public Health Inspector, City of Norwich, is included in the autumn number of the society's quarterly journal, Smokeless Air (2s.). Other features include a chart based on the investigations of Dr. Percy Stocks on the correlation between coal smoke and lung cancer and "Parallel Paths," an article on the similarity between the 19th century opposition to health and sanitary reforms and that of certain interests today in respect of clean-air measures.

SPENCER-BONECOURT-CLARKSON, LIMITED, 28, Easton Street, London, W.C.1—The second issue of "Steam in Industry," a publication "designed to give information and to be of interest to everyone concerned with the economies resulting from the efficient use of fuel," is available. The articles in this issue are "Steam in a Small Factory" (steam for work and warmth for the workers), "Boilerfeed Water Controls" (a review of developments), "Raising the Steam by H.P." (affording efficiency), and "A Tradition of Progress" (perfection brought up to date). Industrial management will find the booklet of considerable value.

GEORGE KENT, LIMITED, Luton (Beds)—Pamphlets received from this company include "Universal Miniature Primary Elements for pH and Redox Measurement" (publication 158), "Standard Ranges: Multelec Mark 2 Temperature Instruments" (publication 323), two specification sheets, one (SS 011) on "Commander KH Series Bell-operated Low-head Instruments for the Measurement of Flow and Differential Pressure" and the other (SS 012) on "Commander KB Series Bellows-operated Level and Pressure Instruments." "ST/L Manometer Spare-parts List" (publication 2530), and "Kent After-sales Service" (publication A52).

COLVILLES, LIMITED, 195, West George Street, Glasgow, C.2—News of the group's major development schemes is contained in the autumn number of Colville's Magazine (3d.). An informative article, "All This Costs Money," points out that much of the development has been financed from the group's own

resources or by loans. To cover the rest, however, Colvilles has recently raised £15,000,000 and the article tells employees how this was done. On the Venezuelan coast gas goes to work in bottles built of Colvilles' high-tensile steel; this story is told in "Propane," another of several interesting features in the magazine.

ATLAS STEELS, LIMITED, Welland, Ontario, Canada—Atlas Steel News, an eight-page magazine, carries a number of interesting stories on the company's activities in its August edition. An article with the attractive title of "Making Money" tells us that actual minting of coins in Canada commenced in 1908 with the formation of the Royal Mint in Ottawa. Administration of the Mint was taken over by the Canadian Government in 1931 and it is now known as the Royal Canadian Mint. Speciality steels from Atlas are used in varied applications throughout the Mint; in fact, most Canadian coins are minted in dies made from Atlas tool steel.

DENVER EQUIPMENT COMPANY, 1,400, 17th Street, Denver 17, Colorado, USA—The 50th anniversary of froth flotation in the United States is being celebrated this year. "Froth flotation is, of course, very close to us," says A. C. Daman, president of the Denver Equipment Company, in the latest issue (Vol. 25, No. 4) of Deco Trefoil, "for during 35 years of the 50 years which we are celebrating the name 'Denver' has been very prominent in every area of mineral beneficiation. We are very proud of the fact that there are more Denver 'Sub-A' flotation cells than all other makes combined." Other contents include an article on "Unusual Applications of the Flotation Process" by L. A. Roe, staff director of minerals processing, International Minerals & Chemical Corporation.

ASSOCIATED ELECTRICAL INDUSTRIES, LIMITED, 33, Grosvenor Place, London, S.W.11—The G6 gas turbine of 7,500 s.h.p. output, forms part of the combined steam turbine and gas turbine propulsion machinery currently being installed in two classes of British naval vessels. The design specification for the gas turbine included some requirements of a novel nature. Details are given in "Gas Turbine for Naval Boost Production," an article by F. R. Harris in the October number of AEI Engineering, on the mechanical construction of the gas turbine and test-bed performance. The possibilities of further development are outlined by the author. Other features of the magazine include "The Work of the Education Officer in Industry," "Clearcall Carrier Communication Systems for Industry," and "The Rodolite, a New Optical Measuring Device."

IMPERIAL CHEMICAL INDUSTRIES, LIMITED, Imperial House, Millbank, London, S.W.1—Behind the scenes ICI has made a considerable contribution to the nuclear age. A feature, contributed by the company's metals division, in the October number of the ICI magazine (2d.) says: "One advance after another has been fostered by ICI research and development in which the new metals produced by the metals division has played a major part." The ingenuity of the scientist has developed a means of focusing the shock waves of an explosion and thereby concentrating its effect. A famous wartime result was the PIAT anti-tank gun. The same basic technique is today used for piercing oil well casings, for lifting submarine cables to effect repairs, and for tapping blast furnaces. H. Thomas tells the story, while no less interesting is Peter Hodgkinson's article on "Titanium—the Tide Turns."

FEDERATION OF BRITISH INDUSTRIES, 21, Tothill Street, London, S.W.1—"Japanese steel output moved up from a mere 557,188 tons in 1946 to 7,000,000 tons in 1952, when Japan regained her independence, and this year's level is estimated at 28,000,000 tons, when the Japanese confidently expect to pass Britain." The reasons for Japan's rapid economic expansion in the post-war period are examined by Peter Robinson in the October number of the FBI Review (2s. 6d.). The writer says that the fact that steel exports have never risen above 3,000,000 tons is a vivid indication of the expanding domestic demand for steel—and the pace of economic growth which creates such a demand. A further article on the work of the federation's technical department is contributed by M. H. Fisher, while James Lawrie writes about "Pipelines in the UK." Pipelines will carry liquids and gases over long distances with great economy and efficiency, and the author states that many new pipeline projects are now being developed in this country.

BRITISH TRANSPORT COMMISSION, 222, Marylebone Road, London, N.W.1—Northamptonshire is featured in the "Industrial Perspective" series in the October number of Transport Age (2s. 6d.). Dennis Brooks, the author, says the Northamptonshire people are proud that what they have has been largely created by themselves. "Out of a past which noted the richness of the region for cattle grazing and its vast forests—conditions which once gave skins and tanning materials—they have built a staple industry of boot and shoe manufacture which today sustains the town of Northampton as well as others, large and small, throughout the shire," he says. "In more modern times, they have developed a bewildering variety of other industries, from engineering and steelmaking to the production of breakfast cereals." Mr. Brooks relates the Northamptonshire story in interesting fashion, and the supporting illustrations are first-class. "A Factory Moves 200 Miles," another of the several excellent features in the publication, tells how joint planning by Lightalloys, Limited, and British Railways meant that a complete factory moved from Willesden (London) to Beverley (Yorks) without seriously interfering with production.

SCHOOL OF WELDING TECHNOLOGY

IT is just four years ago that the council of the Institute of Welding established the School of Welding Technology. Since then, some 600 "students"—designers, technicians, metallurgists, and engineers concerned with the application of welding—have attended its day courses in London each year, while hundreds of more junior staff have attended evening courses in the larger industrial centres.

Nearly one quarter of the team of almost 300 specialist lecturers that has been built up is drawn from the universities, from private consulting practices, and, of course, from the British Welding Research Association; industry itself has provided the remainder from within its own design, fabrication, and development organizations. The range of day courses grows steadily. At present, 39 courses are available and are organized from time to time.

A prospectus, outlining the syllabuses of courses being organized between November, 1961, and March, 1962, is now available from the Institute of Welding, 54, Princes Gate, Exhibition Road, London, S.W.7.

MINES in the United States produced 246,700 short tons of recoverable lead in 1960, the lowest output reported since 1900.

Forthcoming Events

OCTOBER 23

Institution of Production Engineers (Derby Section):—Meeting at the St. James's Restaurant, St. James's Street, Derby, at 7 p.m. "Spark Machining as an Aid to Production," by S. V. Divers.

Institution of Mechanical Engineers (East Midlands Branch):—Meeting at the College of Technology and Commerce (Room 104), Leicester, at 7.15 p.m. Repetition of James Clayton Lecture: "Machine-tool Research, Design, and Utilization," by D. G. Galloway.

OCTOBER 24

Institution of Engineers and Shipbuilders in Scotland:—Meeting at 39, Elmbank Crescent, Glasgow, C.2, at 6.30 p.m. "The Atom in the Future," by W. R. Wootton.

Institution of Plant Engineers (South Wales Branch):—Meeting at the South Wales Institute of Engineers, Park Place, Cardiff, at 7.30 p.m. "Clean, Correct, and Careful:" film and lecture presented by the Skefko Ball Bearing Company, Limited.

Institution of Production Engineers (Luton Section):—Meeting at W. H. Allen, Sons & Company, Limited, Bedford, at 7.30 p.m. Joint discussion with the Eastern Branch of the Institution of Mechanical Engineers on "Theory and Practice in Engineering Management."

OCTOBER 25

Institution of Mechanical Engineers:—Meeting at 1, Birdcage Walk, Westminster, London, S.W.1, at 6 p.m. Presidential address: "Co-ordination in Engineering Research and the Conservation of Scientific and Technical Manpower," by Sir Kenneth Hague.

Institute of Marine Engineers (North Midlands Section):—Meeting at the British Iron and Steel Research Association, Hoyle Street, Sheffield, at 7.15 p.m. "Heatless Repairs to Fractured or Broken Castings," by N. Tinwell.

North East Coast Institution of Engineers and Shipbuilders (Student Section):—Meeting at the Bolbec Hall, Newcastle-upon-Tyne, at 7 p.m. Chairman's address, by P. T. Heywood.

Institute of Marine Engineers (Scottish Section):—Meeting at the Institution of Engineers and Shipbuilders in Scotland, 39, Elmbank Crescent, Glasgow, C.2, at 7.30 p.m. "Elementary Nuclear Engineering," by H. F. Close.

Institution of Mechanical Engineers (Yorkshire Branch):—Meeting at the Royal Station Hotel, Hull, at 7.45 p.m. "Corrosion and Mechanical Engineering in a Chemical Plant," by E. T. Smith.

OCTOBER 26

Institution of Plant Engineers (North East Branch):—Meeting at the Three Tuns Hotel, Durham, at 7 p.m. "Engineering at Coal Mines," by W. J. Currie, head of the mechanical engineering branch, National Coal Board.

Institution of Electrical Engineers (Southern Centre):—Joint meeting with the Southern Branch of the Institution of Mechanical Engineers at Farnborough Technical College at 6.30 p.m. "A General Theory of Depreciation of Engineering Plant," by D. Rudd.

Institution of Mechanical Engineers (North Eastern Branch):—Meeting at Stephenson Building, Claremont Road, Newcastle-upon-Tyne, at 6.15 p.m. Informal discussion on "The Design of Modern Boiler Feed Pumps," by H. H. Anderson.

OCTOBER 28

North East Coast Institution of Engineers and Shipbuilders (Student Section):—Visit to Vickers-Armstrongs (Engineers), Limited, Elswick.

OCTOBER 30

Wigan and District Mining and Technical College:—Joint meeting in the board room with the Junior Section of the Manchester Geological and Mining Society at 5 p.m. "Mechanization and Concentration," by G. W. Sanders, Area production manager, No. 3 (St. Helens) Area, North-Western Divisional Coal Board.

Institution of Mechanical Engineers (Thermodynamics and Fluid Mechanics Group):—Meeting at 1, Birdcage Walk, Westminster, London, S.W.1, at 6 p.m. Discussion on "The Extent to which Data can be Made Available for Engineering Design."

North East Coast Institution of Engineers and Shipbuilders:—Meeting at the Literary and Philosophical Society's lecture theatre, Newcastle-upon-Tyne, at 6.15 p.m. Andrew Laing Lecture: "Aspects of Research in Marine Engineering," by Dr. A. W. Davis.

OCTOBER 30-NOVEMBER 3

Institute of Welding:—Autumn meeting at the Institute of Marine Engineers, Memorial Building, 76, Mark Lane, London, E.C.3.

National Association of Colliery Managers

OCTOBER 25

South Wales Branch:—Meeting at the South Wales Institute of Engineers, Park Place, Cardiff, at 6 p.m. "Science in the Service of Colliery Management," by N. T. Simmons, chief scientist, South-Western Divisional Coal Board.

OCTOBER 26

Lancashire Branch:—Meeting at the Manchester Literary and Philosophical Society, 36, George Street, Manchester, at 4 p.m. R. H. Clough, HM Divisional Inspector of Mines, will introduce his report on the North Western Division for 1960.

OCTOBER 27

North of England Branch:—Annual dinner.

NOVEMBER 1

Scottish Branch:—Meeting at the Mining Laboratories, Grassmarket, Edinburgh, at 5.15 p.m. "The Purpose and Use of Production Control," by J. Brown, manager of Woolmet Colliery.

Automatic Control of Charging Materials to Blast Furnaces

ONE of the blast furnaces at Gary (Ind.) Works of the United States Steel Corporation, reports Steel (August 21, 1961), is now being fed automatically with raw materials drawn from storage in proper proportions, and delivered by conveyor to skip cars and fed into the furnace according to a predetermined charging programme. One important result is that fluctuations in the smelting process are minimized.

Through selector switches the operator can quickly set up or change a programme including sequence of skips, the material to be placed in each skip and the hopper from which it will be withdrawn. Ores and fluxes are kept in 14 hoppers served by two main conveyors, material from each hopper passing over a weigh conveyor before being deposited on the main conveyor, a sensing device on each weighing conveyor producing a digital pulse for each 50 lb. of material delivered.

The system makes it possible for two hoppers to deliver material onto a main conveyor simultaneously, thus reducing overall charging time.

SEAMLESS tube factory of the Matanzas steelworks in Venezuela has been operating since early June.

THE NEXT International Construction Equipment Exhibition will be held in June, 1963. This year's exhibition, held at Crystal Palace, London, from June 15 to 24, was the first International Construction Equipment Exhibition to be held in the UK.

FUEL AND POWER FOR INDUSTRY

DEVOTED exclusively to industrial fuel usage, the Northern Exhibition of Fuel and Power was opened in the Queens Hall, Leeds, on Wednesday, by Mr. John C. George, Parliamentary Secretary, Ministry of Power. Jointly sponsored by the Yorkshire Post and the Steam Engineer, the exhibition will be open daily from 10 a.m. to 6 p.m. until October 27.

Yesterday (Thursday) the Combustion Engineering Association held a one-day conference at the exhibition, the opening address being given by Mr. N. A. McNeill, engineer-in-chief of Unilever, Limited, and president of the association.

The morning session was devoted to a discussion on the emission of grit and dust from small boiler plants. Modern mechanical stokers can be operated so smokelessly as to be permitted in smoke control areas, but some coal-fired plant is still prone to grit and dust emission unless efficient arresting plant is installed. The Clean Air Act requires that all existing plants "shall use any practicable means there may be for minimizing the emission of dust and grit from any chimney." Any new plant which burns pulverized fuel, or which burns more than 1 ton/hr. of solid fuel, must be provided with some form of grit and dust arresting equipment which has been approved by the local authority. No Ministerial regulations have been issued defining "permissible emissions" or suitable arresting plant, and it is with this in mind that the conference discussed what equipment was available and its particular application together with the economics involved.

A paper on the "Measurement of Air Pollution and the Equipment for Prevention" was presented by Dr. R. Jackson, superintendent of the physics department of the British Coal Utilization Research Association, and a paper on the cost of installation and maintenance of equipment was given by Mr. H. Westwood, of James Howden & Company, Limited. An open discussion followed.

In the afternoon the conference discussed a paper presented by Mr. G. Gill, group manager of NIFES for the northern half of the UK.

NIFES has recently completed seven years' work for industrial and commercial users of fuel. During that time detailed surveys, aimed at improving the efficiency of fuel-using plant, have been carried out in over 5,000 factories and premises. In the course of this work efficiency tests have been conducted on nearly 3,000 boilers.

TWO JAPANESE MISSIONS are to visit Brazil shortly to discuss the long-term purchase of iron ore and the enlargement of the port of Vitória, Espirito Santo, to accommodate ore carriers of up to 65,000 tons.

AS A RESULT of a recent sales arrangement between the Wayne Kerr Laboratories, Limited, New Malden (Surrey), and Gertsch Products, Inc., USA, Wayne Kerr now holds sole UK marketing and manufacturing rights for Gertsch precision electronic instruments.

Correspondence

THE MINERS' ROAD BACK

To the Editor of IRON AND COAL.

SIR,—Everyone wishing Britain well must praise your leading article, "Coal's 'Proper Place'," in your October 6 issue, because it places the economic factors of coal plainly before every reader. It is impossible for private ownership to return, and we who believe in private ownership are bound to praise the vast achievements of the National Coal Board, especially in the East Midlands Division.

Having witnessed the phenomenal o.m.s. in the East Midlands, one can only wonder what could be done if attendance would return to pre-nationalization figures and if the workmen (many of whom do) would make every shift available when they are fit to do so. It is true to say that if the loyalty of the workers to production was as strong as that of the NCB officials in every grade then the criticism levelled against nationalization would rapidly decline and a new respect would come from the public towards the industry generally.

We must win back export trade, and then the future of this great industry will be secure; it will help to reduce the cost of living by providing a live cargo to balance our heavy imports of food and raw materials, which are vital for the life of our large population.

When wages were low and the miners' standard of life was not good, the output was 287,500,000 tons (1913), 276,000,000 tons (1923), and, in 1937, 240,000,000 tons at a rate of 309 ton/annum per person employed. The general trend of the miner's mind is to maintain his high standard of life; this can be achieved if the whole industry will follow your excellent advice.—Yours, etc.,

SAM F. MIDDUP.

14, Hucknall Road,
Newstead Colliery,
Nottingham.
October 10, 1961.

FLYWHEEL LOCOMOTIVES FOR MINES

To the Editor of IRON AND COAL.

SIR,—In his interesting paper on "Flywheel Locomotives for Mines" published in your issue dated October 6, 1961, the author, Mr. J. K. Gessler, discussing the maximum payload which a 10-ton locomotive can haul on various gradients, referred to in Fig. 7, points out that the curve shown "is based on 10 lb./ton track resistance, 20 lb./ton sticktion, 20 per cent. starting adhesion, and a mean braking effort of 16 per cent. of the adhesive weight."

Those readers interested in the subject but who are unfamiliar with the word "sticktion" doubtless would appreciate a word of enlightenment on its precise origin and meaning.—Yours, etc.,

L. G. FOKES.

Walton-on-Thames.
October 13, 1961.

A COURSE for buyers of packaging, organized by the Purchasing Officers Association, is to be held at the Connaught Rooms, Great Queen Street, London, W.C.2, on November 28 and 29. There is a course fee of £10 10s. Further details from the Secretary, Purchasing Officers Association, Wardrobe Court, 146a, Queen Victoria Street, London, E.C.4.

NEW CRANE'S

Common Market Potential

INTRODUCTION by Steels Engineering Products, Limited, Crown Works, Sunderland, of the Coles Leda, a fast-travelling, full-circle slewing mobile crane of 4 tons lifting capacity has been made with European Common Market requirements well in mind. This type and size of crane is very popular among European crane users and, at a demonstration of the new crane at Steel House, Eastcote (Middx), a representative of the company told IRON AND COAL that he believed there was a big potential market for the Leda both at home and abroad.

The Leda, although retaining the Coles variable voltage diesel-electric crane transmission, differs noticeably from current Coles mobile crane practice. The power unit is mounted in the crane carrier chassis and consists of a diesel engine with single dry plate clutch and four-speed gearbox, which provides the power for the travel motion. A variable speed generator driven by power-take-off from the diesel engine energizes the electric motors of the three crane motions (hoisting, derricking, and slewing) by direct current at a potential varying from zero to maximum value.

Each motion of the crane is controlled by an interlocked pair of heavy-duty reversing contactors operated by pilot switches conveniently located in a console in the driver's cab. The normal driving routine is to engage the pilot switches for the motion or motions desired while the engine is running at reduced speed and thereafter to control the speed of the motion as desired by varying the engine speed through the accelerator. As the engine is accelerated the appropriate electro-mechanical brakes are automatically released.

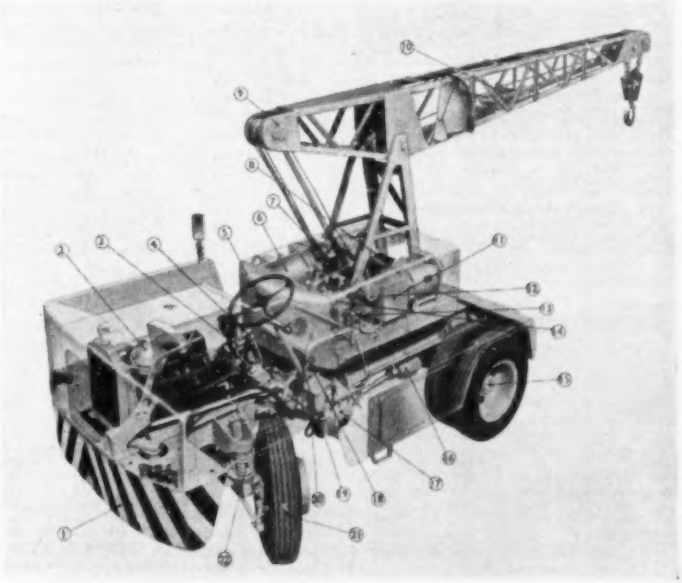
In addition, Coles automatic control and automatic protection is incorporated to safeguard the machine against abuse. This permits the driver to select any motion, irrespective of the engine speed, whereupon the electrical equipment automatically operates to introduce the required motion without shock to the electrical or mechanical components of the crane. No restraint is placed upon the activities of the crane driver and this complete absence of restriction achieves the optimum operating cycle.

The Leda revolves on a large-diameter double live ring of steel balls running in hardened races. This double race ballbearing obviates the need for a centre post and gives more even distribution of loading on the chassis frame. The Coles four-wheel, two-wheel drive chassis is specially designed for crane service. The driving axle is solidly mounted to the chassis frame and the steering axle has coil spring suspension and hydraulic shock absorbers. Hydraulically applied, foot-operated brakes are fitted to all four wheels and manually operated mechanical parking brakes act on the two driven wheels.

WITH THE INTRODUCTION of new equipment and methods, production by Sociedad Mixta Siderurgia Argentina (SOMISA) is expected to increase to 1,200,000 tons of steel ingots annually by the end of 1962 and to 2,000,000 tons by 1965.

FEATURES OF THE COLES LEDA 4-TON CAPACITY MOBILE CRANE.

1.—Underslung ballast. 2.—Diesel engine developing 52 b.h.p. at 1,800 r.p.m. 3.—Gearshift of four-speed synchromesh gearbox. 4.—Power-take-off serving chassis-mounted generator. 5.—360-deg. slewing superstructure. 6.—Variable voltage 10-h.p. hoist motor. 7.—Derrick relay shaft. 8.—Worm gear hoist unit. 9.—Angle cantilever jib. 10.—Safe-load indicator. 11.—Electrical contactor gear. 12.—Electro-mechanical brakes. 13.—Limit switches. 14.—Derrick unit. 15.—Double reduction driving axle. 16.—Slew unit. 17.—Totally enclosed slew motor. 18.—Hydraulically applied brakes. 19.—Hydraulically operated clutch. 20.—Hydraulic power-assisted steering. 21.—Interchangeable wheels. 22.—Coil spring suspension (steering axle).



PIG-IRON AND STEEL PRODUCTION

IN the following United Kingdom pig-iron and steel statistics, issued jointly by the Iron and Steel Board and the British Iron and Steel Federation, Table 1 gives the production of pig-iron and ferro-alloys and the number of furnaces in blast in August. Table 2 gives the production of steel ingots and castings in August and Table 3 gives details of finished steel in July. Activities of the industry are summarized in Table 4.

TABLE 1.—*Weekly Average Production of Pig-iron and Ferro-alloys in August*, 1961. (*Thousands of Tons.*)

District.	Furnaces in blast.	Hematite.	Basic	Foundry and forge.	Ferro-alloys.	Total.
Derbys, Leics, Notts, Northants, and Essex	18	0.3	24.3	18.3	—	42.9
Lancs (excl. N.-W. Coast), Denbighs, Flints, and Ches	8	—	22.2	—	2.3	24.5
Lincolnshire	10	—	44.6	—	—	44.6
North-East Coast	15	2.2	43.7	—	—	45.9
Scotland	6	1.1	19.2	1.3	—	21.6
Staffs, Shrops, Worcs, and Warwicks	5	—	8.0	1.0	—	9.0
South Wales and Mon	11	3.9	55.3	—	—	59.2
Sheffield	2	—	2.7	—	—	2.7
North-West Coast	6	13.3	—	1.2	—	14.5
Total	81	20.8	220.0	21.8	2.3	264.9
July, 1961	83	19.5	233.2	21.7	2.2	276.6
August, 1960*	85	18.3	247.8	21.3	4.0	291.4

TABLE 3.—*Weekly Average Deliveries of New Non-Alloy and Alloy Finished Steel.* (*Thousands of Tons.*)

Product.	1959.	1960.	1960.	1961.	
			July.	June.	July.
Non-alloy steel:					
Ingots, blooms, billets, and slabs‡	5.1	5.6	3.7	7.2	6.4
Heavy rails	6.8	8.7	7.3	9.2	7.1
Sleepers	0.6	0.8	0.7	0.7	1.3
Fishplates and soleplates	0.4	0.6	0.5	0.7	0.4
Plates, 3 mm. thick and over:					
(i) Over ⅜in. thick	24.8	30.9	18.3	34.6	23.1
(ii) Under ⅜ in.	18.3	22.0	17.3	23.6	18.8
Other heavy prods.	41.2	53.1	42.4	53.0	45.1
Ferro-concrete bars	9.6	12.0	10.6	13.9	13.0
Wire rods	23.5	28.6	20.3	27.5	25.5
Arches, etc.	7.8	7.9	6.5	7.8	7.2
Other light sections	33.0	41.3	32.2	37.8	36.3
Bright steel bars	7.6	9.7	9.0	9.6	9.1
Hot-rolled strip	27.4	33.1	27.4	29.5	29.0
Cold-rolled strip	8.0	10.0	8.7	9.1	8.3
Sheets, incl. coated:					
(i) Hot rolled	11.8	12.9	11.0	10.1	8.8
(ii) Cold reduced	35.2	40.6	36.6	40.1	36.9
Tinplate:					
(i) Hot dipped	7.7	8.0	7.3	6.5	6.9
(ii) Electrolytic	13.2	14.4	13.8	14.6	15.7
Backplate	0.7	0.9	0.8	0.7	0.8
Tubes up to 16 in.	20.6	23.8	22.4	24.3	23.9
Tube fittings, etc.	0.4	0.4	0.3	0.4	0.4
Tyres, wheels, and axles	2.4	2.4	2.0	2.3	2.4
Forgings (excl. drop)	2.1	2.2	2.0	2.4	2.3
Steel castings	3.6	4.3	3.3	5.0	4.2
Tool steel	0.2	0.2	0.2	0.3	0.3
Total	312.0	374.4	304.6	370.9	333.2
Alloy steel	18.2	22.5	18.3	25.1	22.9
Total deliveries from UK production†	330.2	396.9	322.9	396.0	356.1
Add: Imported finished steel	7.1	19.1	33.9	5.0	3.9
	337.3	416.0	356.8	401.0	360.0
Deduct: Intra-industry conversion §	47.6	56.4	46.0	53.3	50.1
Total new material	289.7	359.6	310.8	347.7	309.9

† Includes finished steel made from imported ingots and semis.
‡ Other than for conversion into any other form of steel listed.
§ Material for conversion into other products also listed in this table.

TABLE 2.—*Weekly Average Production of Steel Ingots and Castings in August*, 1961. (*Thousands of Tons.*)

District.	Open-hearth.		Bessemer.	Electric.	All other.	Total.		Total ingots and castings.
	Acid.	Basic.				Ingots.	Castings.	
Derbys, Leics, Notts, Northants, and Essex	—	4.5	14.5 (basic)	2.0	—	20.2	0.8	21.0
Lancs (excl. N.-W. Coast), Denbighs, Flints, and Ches	0.8	33.6	—	2.4	0.4	36.1	1.1	36.2
Yorkshire (excl. N.-E. Coast and Sheffield)								1.0
Lincolnshire	—	46.8	—	—	—	46.7	0.1	46.8
North-East Coast	0.4	58.5	—	1.0	0.2	58.9	1.2	60.1
Scotland	0.2	36.3	—	3.6	—	38.1	2.0	40.1
Staffs, Shrops, Worcs, and Warwicks	—	15.2	—	3.2	0.5	17.5	1.4	18.9
South Wales and Mon	0.8	59.7	19.1 basic)	0.4	0.1	79.9	0.2	80.1
Sheffield (incl. small tonnage in Manchester)	4.5	17.5	—	8.3	0.2	29.2	1.3	30.5
North-West Coast	—	—	3.2 (acid)	0.5	—	3.6	0.1	3.7
Total	6.7	272.1	36.8	21.4	1.4	330.2	8.2	338.4
July, 1961	12.6	293.7	40.6	31.2	2.1	369.5	10.7	380.2
August, 1960*	9.9	350.3	34.8	26.1	1.8	413.0	9.9	422.9

TABLE 4.—*Iron and Steel Price Index and General Summary of Pig-iron and Steel Production.* (*Weekly Average in Thousands of Tons.*)

Period.	B.o.T. Price Index. 1938 = 100.			Iron-ore output.	Imported ore used.	Coke sent to blast-furnaces.	Pig-iron ferro-alloys prod.	Scrap used in steel prod.	Steel (incl. alloy).			
	Iron and steel.	Coal. ††	Basic materials§						Imports.†	Prod. ingots, castings.	Delivrs. finished steel.	Stocks.‡
1959	340	496	477	286	244	210	242	208	7	388	291	2,244
1960	339	505	482	329	319	264	303	243	24	467	361	2,702
1961—May*	340	520	484	333	304	254	300	244	5	466	343	2,754
June	341	520	479	326	298	249	297	233	5	447	349	2,679
July	343	520	478	312	270	238	277	196	7	380	311	2,596
August	343	520	480	305	264	226	265	163	5	338	238	2,684

* Months contain five weeks, all tables.
† Weekly average of calendar month.
‡ Stocks, ingots, semi-finished and finished steel at the end of the years and months shown.
†† The index for coal is now based on prices ruling on the last day of each month.
§ Used in non-food manufacturing industries.

Stone Dust Barriers

NEW APPROVALS FOR COAL CONVEYOR ROADS

UNDER Regulation 10A of the Coal Mines (Precautions Against Inflammable Dust) Regulations, 1956, three new types of stone dust barrier have been approved by the Minister of Power. These approvals, covering "light," "intermediate," and "heavy" barriers, represent a further modification of the Polish design of barrier, and follow the recommendations of the Report on Stone Dust Barriers on Coal Conveyor Roads, prepared by the Safety and Health Committee of the Coal Industry National Consultative Council.

The report on stone dust barriers by the Safety and Health Committee of the CINCC is published by the National Coal Board and became available this week. It deals comprehensively with the characteristics of coal dust explosions, the mode of operation of stone dust barriers, and the design, siting, operation, and maintenance of such barriers, together with a consideration of the stone dust barrier regulations.

Copies of the report can be obtained (free of charge) from the Technical Editorial Branch of the Production Department of the NCB at Hobart House, Grosvenor Place, London, S.W.1.

Specifications

The specifications for a heavy barrier and the conditions relating to it are set out in Approval No. 7, issued by the Ministry of Power. Under this approval for heavy barriers, "lightly loaded shelf" means a shelf loaded with not more than 20 lb. of stone dust per ft. of shelf length, and "heavily loaded shelf" means a shelf loaded with more than 20 lb., but not more than 40 lb. of stone dust per foot of shelf length.

The manager of every mine in which stone dust barriers are required to be provided must ensure that each barrier, to which approval No. 7 relates, holds not less than 80 lb. of stone dust per square foot of the average cross-section of the length of road in which it is placed. He must further ensure that no part of any shelf and no stone dust on any shelf is less than 4 in. from the roof or sides of the road or of any prop or other support, and that, so far as is practicable, no stone dust, other than of a type which will not cake under the normal atmospheric conditions of the length of road in which it is to be used, is used in connection with any barrier.

The approvals for intermediate and light barriers take a similar form, with appropriate differences for the total loading of stone dust on the barrier and for the type and proportion of shelves. Thus, the loading of the light and intermediate barriers are, respectively, 22 lb. and 40 lb. of stone dust per sq. ft. of roadway cross-section, compared with 80 lb. for the heavy barrier. Intermediate barriers consist of a mixture of lightly loaded and heavily loaded shelves, not more than one third of the shelves being heavily loaded. Light barriers consist exclusively of lightly loaded shelves.

Existing approvals Nos. 1 and 2 (corresponding to the primary and secondary stone dust barriers of the types in use in National Coal Board mines since 1953) are being revoked with effect from January 1, 1963, and all such barriers should be replaced by that date.

Existing approvals Nos. 3 and 4 (which relate to primary and secondary barriers modified from the Polish design) are also being revoked with effect from January 1, 1963, but no further barriers of this type may be erected or re-erected after the end of 1961.

The effect of these arrangements is that from January 1, 1963, all barriers must comply with one or other of the three new approvals.

Industry's Chief Problems are Human

MOST important problems in British industry were human rather than technical, said Mr. E. Mensforth, chairman of Firth Brown Tools, Limited, and a director of many other companies, speaking at the annual dinner of the Sheffield section of the Institution of Production Engineers last week. The task facing the nation was how to enable the ordinary operator to get the same satisfaction from the job as the engineer.

This was the problem we had to solve, he went on, a human one, to help people to look for new horizons rather than to battle against resisting redundancy.

Mr. John Snow, a director of Snow & Company, Limited, manufacturers of surface grinding machines, of Sheffield, said that as far as engineering was concerned, Britain must join the Common Market. The machine-tool industry was often criticized because it could not fill the UK demand, but it already provided 8 per cent. of the machine tools of the country, and could do far more if the engineering industry would spread the load of its machine-tool orders.

Incentive for Quicker Rail Movement of Coal

RAILWAYMEN in the Midlands have decided to accept for a trial period of three months an incentive bonus scheme offered by the London Midland Region to speed the movement of coal and other freights this winter. The scheme provides for the payment of 6s. to engine drivers, firemen, and guards for every hour saved from the scheduled running time of coal trains, which often carry other freight.

More than 500,000 extra tons of coal are expected to be carried in the Midlands this winter.

Few Miners Agree to Work Saturday Shifts

DUBIETY about working the Saturday shift in the coalfield has been expressed in both Lancashire and Yorkshire. At the monthly conference of the Lancashire Area of the National Union of Mineworkers last week, it was decided to oppose the resumption of the voluntary shift. After the conference the secretary Mr. J. Gormley said: "It would only add to the cost of production immediately and that could be used against us in the future. If determined efforts are made in the pits we can produce the coal required in a five-day week."

The Yorkshire Area of the National Association of Colliery Overmen, Deputies, and Shotfirers, does not think the answer to the problem lies in Saturday working. It has stated that it is prepared to meet the North-Eastern Divisional Coal Board to hear its proposals as they affect Yorkshire.

At a special delegate conference on Monday, the Scottish Area of the NUM rejected the Saturday shift proposals. It was stated that the union would cooperate with the NCB to increase production to ensure enough coal in the event of a severe winter.

The recommendation by the Doncaster Area panel of NUM pit representatives which will go to 23,000 miners in the 11 Doncaster pits is against working the Saturday shift. Mr. Jock Kane, chairman of the panel, said: "The present coal shortage could be alleviated in a five-day week if enough determined effort were made."

Delegates representing 80,000 Welsh miners at a special coalfield conference at Porthcawl on Monday rejected the proposal. A postal vote is to be taken by branches in the South Wales coalfield.

An agreed statement issued on behalf of a meeting between West Midlands Divisional Coal Board and the Midland Area of the NUM states that it has been agreed that all pits in the division may be opened for Saturday working and that four of the six Saturdays shall be worked before Christmas. The matter is now to be referred for detailed discussion at pit level.

Leicestershire Miners' Council, is urging pit lodges to consider working six voluntary shifts on November 11, 18, and 25, and December 2, 9, and 16.

North-Eastern NCB Appointments

NEW appointments announced by the North-Eastern Divisional Coal Board, include Mr. S. H. Grandin who becomes divisional purchasing and stores controller on Monday. Mr. A. J. Smith has been appointed wages and conciliation officer in the divisional industrial relations department.

In the No. 4 (Carlton) Area Mr. R. A. Bonell becomes Area mechanization engineer on November 1, and in the No. 8 (Castleford) Area, Mr. H. Smith has been appointed Area wages and control officer.

IN CONJUNCTION with a group of Scottish firms, Martin, Black & Company (Wire Ropes), Limited, Coatbridge, near Glasgow, is taking part in a tour of Common Market countries in order to stimulate the export trade from Scotland.

Coal Chartering

LESS tonnage has been fixed from Hampton Roads to Japan and current inquiry is not so pronounced. Hampton Roads to Moji-Osaka paid $9.30 for about 15,000 tonner for November shipment on the basis of six days Shinc, and it is further reported that Hampton Roads/Japan for December loading has paid $10.50 on usual terms and 12,000 tons to Osaka direct for December at $9.00, again with six days Shinc. Further tonnage has been taken up to the Brazils, 15,000 and 20,000 tonners both being fixed to Rio at $7.00 for November shipment with 60c. discharge. Inquiry is maintained and charterers are also prepared to consider contracting over 1962, but obviously at under $7.00. Other coal fixtures to Japan include Newcastle, NSW, to two safe ports Tokyo Bay at 44s. f.i.o. for 9,500 tons, November 11/30, and it would also appear that charterers have secured tonnage at the lower rate of 43s. 6d. The only other fixture reported from Hampton Roads is to Cork for about 11,000 tons, early loading, at $5.30 with free discharge.

There appears to be very little movement from the UK to the Mediterranean although charterers do retain some interest to West Italy and there are certainly inquiries from the Continent to the Mediterranean area. South Wales reports a moderate interest for coasting tonnage and there is still a good inquiry from the East Coast to Scandinavia.

More Competition Between Fuel Industries

GOVERNMENT plan to foster more competition between the fuel industries will aim to preserve freedom of choice for the consumer, said Mr. John C. George, Parliamentary Secretary to the Ministry of Power, on Tuesday. He was speaking to the Scottish members of the Women's Gas Federation in Glasgow. Vigorous competition was a spur to efficiency and ensured that the consumer would not be exploited, he said.

Nationalization had led to the creation of boards which were "big business" by any standards and which also were, by their nature, remote from the housewife who bought their products. But the image that they were vast, powerful units so concerned with major issues that the individual counted for nothing should be dispelled. "Nationalization must be successful," he said, "and success demands good public relations."

Coal-mining Safety Exhibition to Tour Durham

CHAIRMAN of the Durham Divisional Coal Board, Dr. W. Reid will open a Divisional Safety Exhibition at Stanley (Co. Durham), next Tuesday. The exhibition will remain in Stanley until Saturday and will then move to Low Row, Sunderland, from October 31-November 4. From November 7-11 it will be on show at Sunderland Road, Horden, and from November 28-December 1 it will be displayed in South Church, Bishop Auckland.

Purpose of the exhibition is to interest not only the miner and his family, but also the public in the growth of safety awareness in this basic industry.

ECSC COAL IMPORTS

Move to Co-ordinate Policy

NATIONAL interventions judged necessary by Governments to help in establishing their energy balances and redressing dangerous situations arising from unfettered competition are not co-ordinated on a community basis within the framework of the European Coal and Steel Community. First step towards remedying this situation is contained in a proposal to the Council of Ministers of the ECSC concerning imports of coal from third countries, decided on by the High Authority at its meeting last week.

The High Authority takes as a fundamental consideration that it is necessary that the imports of energy products for the whole of the six countries should measure up to medium-term needs. Since the national interventions referred to largely contributed to the economic and social difficulties of the present coal market, the High Authority considers vital Community co-ordination, founded on the quantitative and qualitative confrontation of import programmes in the member countries with the needs as they emerge from the annual energy balance sheets.

Bearing in mind that the estimation of imported coal needs raises at the same time the problem of quantity, quality, and price, the High Authority contemplates for the moment presenting the Governments only with precise proposals from the quantitative point of view and, in respect of prices, merely mapping out a few solutions for the Governments to examine.

Committee of Permanent Experts

In brief it proposes that co-ordination of coal imports within the framework of the annual energy balance should be prepared by a small committee of permanent experts constituted by the Authority and representatives of the six Governments. The committee's particular role would be getting together all information about coal imports, the movement of prices, and commercial agreements. On the basis of this information the committee would draft proposals for the quantitative objectives concerning imports from the different member countries.

It also contemplates approaching the Council at least once a year in order to submit import objectives in the form of maximum quotas for the importing country. To this effect it would be indispensable that the Governments agree to establishing a harmonized tariff at a level high enough to keep out imports beyond the maximum free quotas allowed to each country.

In the event of the adoption of this system, which, the High Authority points out, aims at creating for coal a situation similar to that which has existed since 1958 for steel, it would be the responsibility of the Governments to take each of the appropriate measures.

Finally the Authority will recommend the co-ordinating of the approach by member countries towards coal coming from countries where the trade is in the hands of the state.

As far as prices are concerned, the High Authority will confine itself to showing its interest in there being eventually a replacement of imports as far as is economically feasible by coal from the community. This might lead to a fall in receipts due to the adjustments in the direction of the low prices of imported coal, and different formulae could be considered with a view to lessening losses or the particular burdens borne by the coal industry.

In any case, the problem is that of giving to the coal mines the financial opportunity to compete effectively with imported coals, while, at the same time, adapting themselves to the new energy market of the Community.

Success of Miners' Day Release Courses

ATTENTION both at home and abroad had been attracted by the success of the day release courses run by Sheffield University for miners in Derbyshire, said Dr. J. M. Whittaker, vice-chancellor of the University, speaking at the opening of the 10th three-year day release course at the headquarters of the Derbyshire National Union of Mineworkers in Saltergate, Chesterfield, on Wednesday of last week.

He added that the courses, envisaged by Mr. R. A. Butler, Home Secretary and Chancellor of Sheffield University, in his 1944 Education Act, could claim to be the first effective experiment of their kind. The courses were considered "genuine education."

Mr. Maurice Bruce, director of the university's extramural studies department, said it had always been the aim of the courses, which dealt with economic and industrial relations, to preserve the connection between work and study and to assist students to find fuller satisfaction in their industry and union. The students came fresh to their class and produced far more work than they would have done by attending evening classes.

Among those attending the opening of the latest course were Mr. W. L. Miron, chairman of the East Midlands Divisional Coal Board, and Mr. Bert Wynn, secretary of the Derbyshire NUM.

Linby Miners Break Own Output Record

ACHIEVEMENT of a national output record last week by Linby Colliery, No. 6 (Bestwood) Area, East Midlands Divisional Coal Board, has been marked by a message of congratulation from Lord Robens, chairman of the NCB.

Output per manshift was 106.2 cwt., which is twice the average output for the whole division during September and Linby also broke its own record of 95 cwt. set up last month. The pit's OMS was nearly four times the national average.

Orders Placed

COMPLETE INSTRUMENTATION and control system for the new Drakelow "B" power station has been supplied, installed, and commissioned by the Electroflo Meters Company, Limited, London, N.W.10, a member of the Elliott-Automation, Limited, group, at a cost of over £250,000.

A CONTRACT has been placed with Henry Simon, Limited, manufacturers of bulk flour handling plants, container-making machinery, etc., of Stockport (Ches), for the design, supply and installation of a new animal feed grinding and mixing plant at Lisbon for Companhia Industrial de Portugal e Colonias.

A CONTRACT has been received by Babcock & Wilcox, Limited, engineers, and manufacturers of water tube boilers, etc., of London, N.W.1, from the Potomac Electric Power Company, Washington, DC, to build two steam boilers for an electric generating station.

AN ORDER WORTH over £330,000 for diesel-alternator sets for the Commission Federal de Electricidad of Mexico has been received by the diesel engine division of the English Electric Company, Limited. There was severe international competition for the order. The company is also to supply equipment to the value of £300,000 for Tanganyika's largest hydro-electric station.

AN ORDER worth £120,000, to supply a coal-washing unit, to treat 200 tons an hour, to Yugoslavia, has been won by Nortons-Tividale, Limited, colliery engineers, and manufacturers of fabricated steelwork, etc., of Tipton (Staffs). The order is said to be the first of its kind to be given to a British firm.

THE General Electric Company, Limited, has recently received an order, worth nearly £70,000, for blending machines to be installed in the Athus steelworks, Belgium, of S. A. Cockerill-Ougrée. The equipment is to be incorporated in an ore-blending plant and comprises a reclaiming machine; transfer car; and a double-hinged boom stacker. All the structural steelwork is to be fabricated in Holland but all other parts will be manufactured in this country and sent by GEC direct to site.

WON IN STIFF COMPETITION against British and Continental firms, William Dickinson & Company, Limited, iron and steel importers and exporters, and iron-ore importers, of Newcastle-upon-Tyne, has received an order, worth £37,000, for 750 tons of steel to build a large office block in Christchurch, New Zealand. The firm has also secured a contract for the shipment of steel, valued at £7,000 for a paper mill in Auckland. Additions to the firm's regular Canadian orders, are two £9,000 contracts, also for steel, to be sent to Montreal. All these orders were negotiated by Mr. M. Irwin, a director of William Dickinson, while on a world business tour last year.

AMONG THE LATEST orders for gas carburizing furnaces received by Wild-Barfield Electric Furnaces, Limited, is one from Crofts (Engineers), Limited, Bradford, which calls for two furnaces of dissimilar size and a large forced air circulation equipment for tempering and stress relieving. When completed, the installation will be used for gas carburizing and heat-treating wormshafts for worm reduction gears: the case depth will be 0.035 in. An order for six heat-treatment equipment units has recently been received from Samuel Fox & Company, Limited, branch of the United Steel Companies, Limited, and there is, in addition, a seventh equipment that will be a modified standard furnace. The order calls for three forced air circulation and three horizontal batch type furnaces with a special high temperature equipment, and because of standardized production delivery began within a few weeks.

Duke of Edinburgh's Advice to Industry

SPEAKING in London on Tuesday to 120 industrialists, the Duke of Edinburgh said: "Gentlemen, I think it is about time we pulled our fingers out." He was addressing a luncheon of the Industrial Co-partnership Association and referred to "the most discouraging picture of industry" produced by "that distressingly large proportion of responsible people in all parts of industry who simply will not look ahead." He described his choice of phrase as "one I picked up during the war, brief and to the point."

In his reference to people who would not look ahead, the Duke said: "They live in a little world of their own, blissfully ignorant that reality has passed them by till one day they wake up and find themselves ruined. When that happens it is never their fault; everything and everybody else is to blame. They never suspect their own shortcomings.

"In this day and age a nation is judged by its reliability in commerce, prompt delivery of goods, and the satisfactory completion of contracts. Just at this moment we are suffering a national defeat comparable to any lost military campaign and it is self-inflicted."

It was essential, he said, for the heads of all groups, management, union, civil service and political to realize that they were all on the same side. "Foreign competition is real and it is going to get a great deal tougher. If we want to be more prosperous we've simply got to get down to it and work for it. Technical training must be streamlined, industrial relations tackled with realism, improvements installed in time, design and methods of manufacture brought up to date." There should be energetic salesmanship overseas and enterprise and adventure in investments, he added.

Aron Electricity Meter Business Acquired

FERRANTI, LIMITED, and Aron Meters, Limited, announce that Ferranti has agreed to purchase Aron's electricity metering business including manufacturing tools and equipment for £440,000. Both companies are substantial manufacturers of electricity meters, and were pioneers in the measurement of electrical energy. Ferranti is at present the largest manufacturer in Britain, half its output being exported. A £250,000 programme of modernization in its meter department at Hollinwood is currently nearing completion.

At present there will be no change in the conduct of the Aron meter business which will continue from Salusbury Road, Kilburn, as hitherto. Eventually, the acquisition will enable production to be concentrated on one basic type of meter for each tariff service thereby substantially increasing the scale of production and permitting economic competitive selling prices in all export markets.

To avoid confusion, Aron proposes shortly to change the name of its company to Astaron Electronics, Limited, thereby releasing its present title for use by a newly-formed subsidiary of Ferranti.

IRON AND STEEL TRADE

FOR the limited orders now reaching them for heavy structural shapes and plate, the rolling mills have ample stocks of ingots. Except in the demand for universal beams, which is being fairly well sustained at a level approaching near-capacity of the large Lackenby mill, orders for other types of heavy sections and joists are barely sufficient to keep the mills employed, even on the present short-time working basis. It is obvious from the healthy state of the order-books of the engineering trades and also the quantity of structural steel being used by contractors, that a good deal of material is being lifted from stock.

Pig-iron

The reduced call for pig-iron has resulted in the closing down of some furnaces and the majority of the rest are having to produce at lower levels in order to maintain some balance between output and demand. Fortunately oversea buyers are taking up some of the spare tonnages available.

Foundry grades of pig-iron are plentiful and the engineering and speciality foundries maintain a reasonably good demand for the low phosphorus and hematite irons.

Ferro-alloys

The demand for ferro-tungsten is unchanged, but there is a fair call for ferro-molybdenum and ferro-vanadium. Both the low- and high-carbon grades of ferro-chrome receive steady attention, and ferro-silicon continues to be supported, although at a slightly lower level. Interest in ferro-niobium has not recovered yet, and ferro-titanium is quieter. There remains a fair call on chromium metal.

Semi-finished Steel

Business for the products of the re-rollers is no more than moderate, and in a number of cases, poor. Though a fairly good demand is reported for reinforcing rods and bars, the call for small bars, light sections, and strip is well below output levels. Orders arising are quickly completed and there is little forward booking.

Home steelworks have no difficulty in meeting the demand for steel semis and even carbon steels are for the most part, readily come by. Deliveries of alloy steels are not quite so prompt.

Finished Steel

Consumers of sections and joists are now only buying such sizes as are required on a week-to-week basis for current contracts, as many sections are easily obtained without having to book forward. The makers of bright drawn bars are suffering from an acute shortage of orders and considerably greater tonnages of arches, pitprops, light rails, and other colliery requirements could be supplied without any strain on the makers.

Flat and corrugated galvanized sheets and the high-carbon special-alloy steels for the engineering trades are the brighter sections of an otherwise dull market.

ACTUAL PRODUCTION of raw steel in the US during the week ended October 16 totalled 2,071,000 tons, a fall of 1.5 per cent., compared with the 2,102,000 tons produced in the preceding week. Production to date in the current year at 74,622,000 tons is 10 per cent. down on the 82,902,000 tons produced in the same period last year.

Ore Chartering

GENERAL tone and trend of the markets is unchanged, although in certain areas charterers have been compelled to improve on last rates paid in order to cover reasonably early loading positions. As far as the Mediterranean is concerned, despite a fair miscellaneous demand, very few fixtures have been reported. There is certainly a shortage of tonnage from the Eastern Mediterranean area which may well affect rates to be paid from Morphou and Vassiliko Bay and from middle Mediterannean area. Savona pyrites to Barrow reports 25s. 6d. f.i.o. and trimmed for 4,000-tonner November 10/25.

West African chartering is slow to develop as although tonnage could be made available it would be on a ballast basis and in this respect bauxite charterers from Takoradi were required to pay 60s. for middle November loading for 9,000 tons to Burntisland, with the option of Grangemouth at 10s. 6d. less, and here inquiry is maintained for early and later position. Tonnage is also scarce from the South African ports and here again charterers may require to readjust their freight rates. Elsewhere, Bombay/West Italy paid 42s. f.i.o. and trimmed for 9,500 tons, second half October, and Cuddalore to West Italy reports 42s. 6d. on the same basis for October 16/25 for about 10,000 tons and from South Africa Durban or Port Elizabeth to Osaka-Kobe Range fixed 14,000 tons for November 8/25 at 55s. 6d. f.i.o. and trimmed.

There is possibly a little more interest for tonnage to load phosphate from Casablanca with 4,500 tons fixed at Immingham at 30s. 6d. for October 20/30 and there is also some inquiry for tonnage on a consecutive voyage basis to Holland. Huelva to Belfast pyrites reports 2,800 tons for October at 37s. 3d. f.o.b. basis, and 2,200 tons to Galway at 32s., also October loading. Further tonnage has been taken from Pasajes to the Tees at 22s. f.i.o. for about 6,500 tons, early November loading.

Fall in SCOW Output

FIGURES issued by the Steel Company of Wales, Limited, on Thursday of last week show that total output declined by 446,000 tons in the year ended September 30, compared with the same period in 1960. Combined coke, iron, and steel output in the last year was 7,941,000 (8,387,000) tons.

The following figures illustrate the general decline in output throughout the company's range of basic products:—Coke, 1,434,000 (1,494,000) tons; pig-iron, 1,830,000 (1,918,000) tons; steel ingots, 2,633,000 (2,777,000) tons; tinplate, 790,000 (891,000) tons; sheets, 1,012,000 (1,113,000) tons; plates, 242,000 (194,000) tons.

Coalfield News

Nearly 50 Years On

ON October 14, 1913, one of the worst pit disasters in the history of British coal mining took place in Senghenydd, South Wales. Of the 953 men that went down the York pit only 496 came out alive. Eight days after the explosion underground fires were still burning and further exploration was suspended.

On October 12, 1961, there was another explosion at the pit which has stood derelict since the industrial depression. This time it was to bring down the winding gear and to mark the clearing of the site and filling in the shaft.

THE CENTRAL EAST AREA of the Scottish Divisional Coal Board is to spend £800 a year on a competition to encourage accident prevention.

MINERS AT Firbeck Colliery, near Worksop, who had been on strike for five days after claiming that the management locked out some pieceworkers, resumed work on Monday.

FIVE-YEAR-OLD RECORD at Norton Colliery, Stoke-on-Trent, was broken in the week ended October 7 when OMS overall rose to 33.4 cwt. The previous best was 33.1 cwt. in November, 1956.

AFTER 50 YEARS in the mining industry Cllr. George Barclay has retired. He has been chairman of the Frances-Randolph branch of the National Union of Mineworkers for the past 14 years.

TOTAL OF THE FUND raised by Mr. J. Rose, chairman of Wombwell Urban District Council, for the dependants of those who lost their lives in the Cortonwood Colliery accident is now £287.

COAL AND COKE shipments from the South Wales ports improved last week. At 63,035 tons they showed a recovery of 3,100 tons on the previous week and an improvement of 8,960 tons on the corresponding period a year ago.

FOLLOWING THE one-day strike staged by 30 coal fillers last Friday, work at Choppington "B" Colliery (Northumberland) was back to normal on Monday. A pay grievance was discussed between union officials and the management.

MR. ARNOLD OGDEN, who has retired from Barrow Colliery, Birdwell (Yorks), after 50 years in the mining industry, at one time worked alongside his father and six brothers at the coal face. He worked at Rockingham and Wharncliffe collieries before going to Barrow 27 years ago.

BECAUSE THE Polkemmet Colliery (Whitburn) NUM committee has challenged the NCB decision to dismiss nearly 300 miners at the colliery for persistent early finishing the notices were suspended last week-end. The notices will remain suspended until a final decision is reached.

IT HAS BEEN AGREED by the National Coal Board and the Adwick (Yorks) UDC, that whatever decisions may be reached regarding the vacating of houses for mineworkers, retired miners and their families will not be turned out of their homes to make way for incoming miners.

WORK WAS RESUMED on Tuesday at Brora Colliery, Sutherland, which had been out of production since April. The miners are running the pit with the aid of a loan from the Highland Fund and Mr. John Rollo, chairman of the fund and of the miners' board of directors, worked at the face for two hours on Tuesday.

THE National Union of Mineworkers is to oppose the NCB proposal to close Llanbradach Colliery (Mon), and transfer the 580 men employed there to other pits in the Rhymney Valley. The NUM's chief inspector, Mr. Lyndon James, is to make a technical report on the colliery, after which the union will consider the matter further.

OVERALL PRODUCTIVITY in the Durham Division of the NCB for the 40th week of the year was near the record for the coalfield. The average of 23.52 cwt. per manshift was only 0.01 cwt. below the record established in the 25th week of this year. The average OMS in the same week last year was 22.91 cwt. per manshift. At the face, OMS reached 66.62 (65.31) cwt.

EXECUTIVE OF THE National Union of Mineworkers decided yesterday (Thursday) to press for a £1 a week pay increase for 325,000 of its workers and for adult rates for workers from 18 years upwards—instead of 21 as now. The claim, which will be put to the National Coal Board on November 15, will, if granted, cost the industry more than £15,000,000 a year.

DURING SEPTEMBER the accident rate at Blackhall Colliery, West Hartlepool, was, at 118 per 100,000 manshifts, the lowest on record, Mr. George Murray, the colliery manager, revealed at the quarterly prize draw for accident-free miners. It is now more than five years since there has been a fatal accident at the colliery and there has been no serious accident since April.

CONCERN at delay in the issue of a statement by the NCB about the future of Glenochil Mine (Clackmannanshire) was expressed at a meeting of the county planning committee on Monday. It was agreed to give the county clerk another month to endeavour to get a statement from the Coal Board before asking Mr. Arthur Woodburn, MP, to take the matter up in Parliament.

RECESSION IN the coal industry and increased mechanization in the mines has resulted in an increased loss of manpower from the Derbyshire coalfields to other industries, reveals Mr. A. Latham, the county's planning officer. In his annual report he warns that more heavy industry will be required in the coalfields in the "not-too-distant future" if the loss is to be adequately checked.

IN ORDER to get to the seat of an underground fire in the front garden of the Leicester home of Mr. William Insley, a colliery deputy, firemen are removing tons of old colliery waste, which has been burning and heating the cold water supply. Mr. Insley's house stands on made up ground and the soil is full of pieces of coal. During the 1926 strike he mined the back garden and took out 30 bags of coal a day. Tenants on the estate have now been asked not to light bonfires to avoid setting the ground alight.

NCB Appointment Upsets Midlands Miners

PROTEST at the appointment of an Area general manager as the new industrial relations director for the West Midlands Divisional Coal Board, has been made by the Midlands Area executive of the National Union of Mineworkers, on the grounds that there was no consultation either at divisional or national levels.

The appointment referred to is that of Mr. T. Jameson, general manager of the South Staffordshire and Shropshire Area. The NUM maintains that there has always been an understanding between the NCB and the NUM that there would be consultation between the two sides on industrial relations appointments of this kind.

THE COAL TRADE

MERCHANTS are making a valiant attempt to see that all orders placed are executed at summer prices, but there is the usual glut of last-minute orders from the laggards and in some parts of the country it will not be possible to marry up all orders to stocks available. The merchants will, of course, be blamed if there is any considerable backlog of orders unfulfilled, the customer always having a valid excuse for having left things to the last minute. The industrial market is brisker, mostly due to the onset of central heating.

SCOTLAND

Glasgow—Trade generally is becoming more animated, and supply and demand are much nearer balance than hitherto. Although weather has for the most part been moderate for the time of year consumers are taking steps in anticipation of normal spaceheating loads at any time, and this is particularly evident in the domestic market. A considerable number of householders are now aware of the advance in prices next month and orders are reaching merchants in increasing numbers.

All available output of large coal is now being taken up, and a strong demand is expected to persist from now on. The supply is certain to be inadequate, and an increasing quantity of doubles will have to be accepted. Interest in this fuel is growing steadily and has been further stimulated by the installation of a coin-in-the-slot machine in Edinburgh. Although costing the equivalent of 11s. per cwt. as against about 6s. 9d. loose, householders appear content to pay the premium for the convenience of the service. In the industrial sector consumers are building up stocks steadily. The power stations are carrying 200,000 tons more than last year, with a stockpile of 650,000 tons, which should obviate many of the difficulties which the electricity industry ran into last winter, although margins will not be excessive in a long, cold spell. Washed smalls, duff, and pearls are consequently moving away well, as are most sized sorts with the exception of coking smalls. Surplus production of these is still being put on the ground. All grades of anthracite are busy, with supplies of nuts falling particularly short of requirements. Manufactured fuels meet an improving demand, as do hard coke and gas coke. Briquettes are a rather slower trade. Metallurgical coke requirements are comfortably supplied.

Fife and Lothians—Output is not all it might be in these zones, especially in Fife, and the volume of orders is sufficient to keep the position tight. A full offtake of house coal is assured, and doubles are also moving fairly well. There is a steady demand for industrial sorts.

Phimax Smokeless Fuel Comes on the Market

PRODUCTION of Phimax, the solid smokeless fuel developed by the North Western Gas Board for use in any kind of open fireplace has now begun at the board's Wigan works. Throughout the winter output will be at the rate of 1,200 tons weekly.

It will be sold both through merchants and direct to householders in and around Wigan, Warrington, St. Helens, Widnes, Ashton-in-Makerfield, Newton-le-Willows, Golborne, and the Runcorn urban district. Merchants will be able to obtain supplies next Wednesday and the general public a week later.

Coal Output Nears 4,000,000 Tons

IT is a long time since one week's output of saleable coal topped the 4,000,000-ton mark, but last week it reached 3,913,900 tons, 32,000 tons better than the previous week and nearly 6,000 tons better than a year ago. Output per manshift continues to mount and in the week ended October 7, OMS at the face reached 85.12 cwt., compared with 84.56 cwt. the previous week and 80.78 cwt. last year.

Consumers' stocks are now over 17,000,000 tons, the trade being 3,000,000 tons better placed than it was last year.

There were 562,430 wage-earners on colliery books on October 7, against 587,660 on October 8, 1960, the numbers engaged at the coal face being 210,670 and 222,500 respectively. Total absenteeism (all workers) in the week ended October 7 was 15.56 per cent., compared with 14.78 per cent. in the week ended October 8, 1960. Output at the face was 4,256 tons and overall 1,483 tons in the week ended September 30, compared with 4,039 and 1,418 tons in the week ended October 8, 1960.

The following table gives (in tons) the provisional figures of output of saleable mined coal by division in the week ended October 14, and the tonnage lost through disputes:—

Division	Week ended October 14, 1961.		Week ended October 15, 1960.
	Total output.	Tonnage lost.	Total output.
Scottish	351,000	14,000	359,000
Northern (N&C)	242,000	1,000	244,000
Durham	449,000	1,000	465,000
North-Eastern	819,000	12,000	816,000
North-Western	242,000	1,000	266,000
East Midlands	921,000	1,000	899,000
West Midlands	291,000	—	278,000
South-Western	359,000	6,000	388,000
South-Eastern	28,000	1,000	30,000
Great Britain—			
Deep-mined coal	3,702,000	37,000	3,745,000
Open-cast coal	169,000	—	121,000
Other deep-mined (including licensed mines)	43,000	—	41,000
TOTAL	3,914,000	37,000	3,907,000

FIRST OFFICIAL British trade delegation to visit Japan since the war will leave for Tokyo in April. Sponsored by the London and Birmingham Chambers of Commerce, it will have the full support of the Board of Trade and of the Japanese Government. The 20-man mission, led by Lord Kilmarnock, president of the London Chamber of Commerce, will represent a wide cross-section of industrial, commercial, and banking interests. Latest official figures show that there has recently been a sharp increase in British exports to Japan.

Law Cases

Cementation Company and NCB Appeal Fails

APPEAL by the Cementation Company, Limited, and the National Coal Board from a judgment of Mr. Justice Stevenson at Swansea ordering them to pay £2,000 damages and costs to Mr. Egeslaw Majewski, for the loss of his right eye at work was dismissed by the Court of Appeal.

Respondent was struck in the eye by a piece of wire rope in 1959 while working underground at Abernant Colliery, Pontardawe. He was then employed by the Cementation Company which was carrying out work for the NCB. It was agreed that the board was entitled to an indemnity by the company in respect of any damages and costs for which it was found liable.

Lord Justice Sellers said there were conflicting stories as to how the accident happened, but in his view the trial judge was entitled to accept the version of Mr. Majewski. This was that the wire rope broke after being under heavy tension. Being of a springy nature, the coil of rope sprung up and hit Mr. Majewski.

The employers had failed to prove that the rope broke without fault on their part. The breaking was quite unexplained and should not have happened with an efficient rope.

COLLIERY WORKER ALLEGES HORSEPLAY

"DANGEROUS horseplay" which led to the loss of the sight of his left eye was alleged by Mr. Walter Mannarn in his action for £1,500 damages against the National Coal Board. He stated he was working at a picking table at Aitken Colliery, Kelty (Fife), when something struck him in the eye. He maintained it was a piece of clay thrown by another workman.

In his judgment, Sheriff John Mowatt said that partial loss of sight was probably due to the plaintiff's injury at the picking table, but there was no corroboration that it was a piece of clay deliberately thrown rather than a piece of redd thrown off the table during the breaking-up process. The action therefore failed.

BRICKLAYER SUES NCB

JUDGMENT was reserved by Judge H. A. Tucker at Hanley County Court after hearing a claim for damages against the National Coal Board brought by Mr. George Long (41), a bricklayer. Mr. Long sued the board for damages for injuries received as a result of a wagon accident on the surface at Deep Pit, Hanley (Staffs), in January, 1960.

The board contended that it had never permitted the plaintiff or his employers to be on the premises and that, in fact, the plaintiff was a trespasser.

FOR HAVING two cigarettes in his possession at Michael Colliery, East Wemyss (Fife), Robert Napier was fined £12 at Kirkcaldy Sheriff Court.

SAID TO BE the only firm of its kind to run courses in safety consciousness for tool setters, Rubery, Owen & Company, Limited, structural and manufacturing engineers of Wrexham, pleaded Guilty to a charge of not having a part of its machinery securely fenced and was fined £50 at Wrexham Magistrates' Court. It was the first time the company had been on such a charge, it was stated.

Miners Should Head Clean Air Campaign

PRESENTING his annual report to Blackwell Rural District Council, last week, Dr. Angus Robertson, Medical Officer of Health, said miners should be among the leaders in campaigning for clean air. "They have seen many of their comrades killed by chest diseases caused by polluted air in the pit. Surely they should be all the keener to have clean air when they get up on top again," he said.

"As well as domestic fires, colliery chimneys show how coal can be wasted," he contended. "It often seems to me they could not cause more smoke if they tried. If I were a miner I would be dead insulted to think that while the workers below were getting coal those on top were just as busy wasting it."

NCB Area Production Manager for Neath

DEPUTY Area production manager (operations) of the No. 9 (Neath) Area, South-Western Divisional Coal Board, since 1955, Mr. Roger James Griffiths has been appointed production manager of the Neath Area in succession to Mr. P. G. Weekes. He took up his new appointment on Monday.

Mr. Griffiths, who is 48, holds a first-class certificate of competency. From 1947 to 1953 he held the post of group agent in various groups in the division and then was appointed Area development engineer in the No. 9 (Neath) Area.

He is a member of the National Association of Colliery Managers and an associate member of the Institute of Mining Engineers.

Recent Wills

CARTER, JOHN, of Pontefract (Yorks), a retired colliery salesman £10,930

ROGERSON, LEONARD, of South Elmsall, near Pontefract, electrical engineer at Upton Colliery ... £1,982

LAWSON, R. G., principal of Ogden & Lawson, brassfounders, etc., of Workington (Cumberland) ... £39,637

SQUIRES, T. L., former managing director of the Gloucester Railway Carriage & Wagon Company, Limited £4,579

MCGOWAN, LORD, honorary president of Imperial Chemical Industries, Limited, and its chairman from 1930 to 1950 ... ... £207,452

RAYNER, L. K., director of Light Alloy Construction, Limited, Summersons Foundries, Limited, and a number of other companies £40,264

DAWSON, CLIFFORD, former works manager of John Davis & Son (Derby), Limited, manufacturers of mining and scientific apparatus £6,499

NORTON, JOHN, chairman of Norton Industries, Limited, and associated throughout his career with the metals and foundry trades £387,416

FREER, ERIC, a director of the Staveley Iron & Chemical Company, Limited, and former works director and foundries general manager £9,987

SLATER, B. T., formerly a director of T. C. Jones & Company, Limited, steel structural engineers and steel stockholders, etc., of London, W.12 ... £2,536

RISK, JAMES, former chairman of Mitchell, Russell & Company, Limited, ironfounders, stove and grate manufacturers, etc., of Bonnybridge, Scotland £101,912

HODSON, E. B., for 53 years with the Staveley Coal & Iron Company, Limited, as engineer. He was a National Coal Board consultant at nationalization £12,209

WINTERTON, H. T., general manager and a director of Wm. Cumming & Company, Limited, makers of foundry blacking and requisites, of Glasgow £13,944

ARROWSMITH, GEORGE, retired engineer and formerly a director of Hick, Hargreaves, & Company, Limited, engineers, ironfounders, etc., of Bolton £47,557

COMPANY NEWS

COLTNESS IRON COMPANY, LIMITED—Court sanction has been obtained for the capital repayment of 1s. 8d. per 6s. 8d. share. Payment will be made on December 15 to holders registered on November 3.

DUCTILE STEELS, LIMITED—With a final of 15 per cent. dividend for the year to June 30, 1961, is held at 22½ per cent. Following the previous year's record, group profits declined to £722,164 (£844,112) and, after lower tax of £363,939 (£425,090), the balance is £358,225 (£419,022).

NEEPSEND STEEL & TOOL CORPORATION, LIMITED—Group trading profit rose from £1,210,920 to £1,473,348 and the net profit advanced to £765,294 (£704,246). The ordinary dividend is maintained at 50 per cent. for the year to March 31, 1961, with an unchanged final of 37½ per cent.

FIRTH CLEVELAND, LIMITED—Treasury consent has been given for the sale for £1,927,940, cash, of the company's 56.7 per cent. holding in the Solartron Electronics Group, Limited, to Schlumberger, Limited, an international organization giving technical services to the oil industry and which has substantial interests in electronics.

SMITH'S STAMPING WORKS (COVENTRY), LIMITED—A final of 6 per cent. makes a 10 per cent. dividend for the year ended July 31, 1961, on a capital increased by a one-for-two scrip issue. A similar equivalent was paid for the previous year. Group trading profits expanded to £553,919 (£524,125), and the net profit is £172,889 (£181,233).

WOLSELEY-HUGHES, LIMITED—Although the final dividend of the company, a holding concern controlling a number of engineering companies, is being held at 10 per cent. total for the year ended July 31, 1961, is being increased to 15 (12½) per cent. because of the higher interim. Net profit, after tax, for the year is £211,275 (£128,636).

GEORGE CLARK (SHEFFIELD), LIMITED, steel sheet, rod and bar rollers—Net profit for the year ended June 30, 1961, is £62,180 (£53,018), after tax of £75,489 (£51,711). A final dividend of 10 per cent. and a bonus 5 per cent. maintains the 20 per cent. for the year. Trading results, says the chairman, were a record and, like all records, will be difficult to maintain.

BRUCE PEEBLES & COMPANY, LIMITED, manufacturing electrical engineers, etc., of Edinburgh—Hambros Bank announces that its offer on behalf of the company to acquire the shares of the Belmos Company, Limited, colliery and industrial switchgear manufacturers, of Belshill (Lanarkshire), has been accepted to the extent of over 99 per cent. of the ordinary and all the preference shares. The offers are therefore now unconditional.

AURORA GEAR & ENGINEERING COMPANY, LIMITED—Group net profits increased to £72,523 (£34,320) in the year to June 30, 1961, after tax of £67,091 (£25,118). The results include six months' trading in respect of the new acquisitions. Final dividend of 17½ per cent. makes 22½ per cent., as forecast, on capital as increased by a one-for-two-rights issue and shares issued against acquisitions. A similar total on the smaller capital was paid for 1959-60.

STOTHERT & PITT, LIMITED, cranemakers, engineers ironfounders, etc., of Bath—Profits fell sharply from £1,088,328 to £737,395 in the year to June 30, 1961, mainly due, the directors say, to the disastrous floods which occurred in October and December of last year. The December flood was the worst recorded for over 80 years and caused considerable dislocation in the company's works, with serious loss of output. The dividend is maintained at 20 per cent. with a final of 15 per cent.

RANSOME & MARLES BEARING COMPANY, LIMITED, manufacturers of ball and roller bearings, and lineshafting equipment, of Newark (Notts).—Net group trading surplus has fallen by about 23 per cent. to £1,354,000 for the year to June 30, 1961. After tax of £594,632 (£814,000) and depreciation of £453,000 (£381,000), the group net profit for the year was £759,419 (£902,513). A second dividend was declared at the beginning of September, maintaining the total at 14 per cent. for the year, and no further dividend is to be recommended.

METAL CLOSURES, LIMITED—As a result of negotiations with the shareholders of Plastic & Metal Industries (Pty), Limited, all the issued ordinary share capital has been acquired in exchange for 291,666 ordinary 5s. shares in the Metal Closures group. Plastic and Metal is one of the leading makers of collapsible metal tubes and plastic goods in South Africa. Metal Closures group has also acquired in exchange for 23,610 ordinary 5s. shares each in the company the outstanding 9,445 ordinary £1 shares in Metal Closures Properties (SA) (Pty), Limited, which thus becomes a wholly-owned subsidiary.

LAKE & ELLIOTT, LIMITED, steel and ironfounders, etc., of Braintree (Essex)—Although the short-term order position is satisfactory, Mr. C. J. Lake, the chairman, stresses that sustained effort is needed to keep all activities in full production. Little benefit from Shanks Ironfounders, Limited, acquired this month, is expected in the coming year, and it may take up to five years, or more, before the subsidiary in France is fully developed, he says. The French project will enable the group to trade in markets which have hitherto been very difficult to enter. Other negotiations for the manufacture of the group's products oversea are continuing.

GLOUCESTER CARRIAGE & WAGON COMPANY, LIMITED—Group net loss of £303,789 was incurred in the year ended May 31, 1961, compared with a previous net profit of £143,403, and no dividend is recommended for the year against a previous total of 10 per cent. The loss is arrived at after crediting total tax relief of £117,000 against a tax charge last time of £81,000. In view of the prevailing conditions in the railway rolling stock industry, work in progress has been written down by £82,000 which contributes towards the net loss. During the year the greater part of the holding in Wagon Repairs, Limited, has been sold, the net profit on the sale being £282,000, which has been transferred to capital reserve.

RICHARDSONS, WESTGARTH & COMPANY, LIMITED, marine, turbine, electrical and general engineers, boilermakers and ironfounders, etc., of Wallsend-on-Tyne—The directors state that the reorganization measures, outlined last August, do not reflect any alteration in the company's policy towards the marine engineering market. On the contrary, they add, it is hoped that the administrative changes now being implemented will materially strengthen the ability of the subsidiary companies within the group, George Clark & North Eastern Marine (Sunderland), Limited, the North Eastern Marine Engineering Company, Limited, and Parsons Marine Turbine Company, Limited, to compete more effectively under the present difficult conditions.

Union Leader's Praise for UK Shipbuilding

REVIEWING the present state of the British shipbuilding industry at the executive committee meeting of the Confederation of Shipbuilding and Engineering Unions at York on Thursday of last week, Mr. E. J. Hill, general secretary of the Boilermakers' Society, said that British shipbuilders were in the final stages of completing reorganization schemes which would make the industry the most competitive in the world. Shortage of steel and other materials after the war had prevented widespread modernization until the last three years.

Quoting some recent outstanding examples of shipbuilding particularly from the North-east Coast, Mr. Hill said: "It must be remembered that these feats have been achieved without the builders receiving subsidies, either direct or hidden, which most of their competitors benefit from. It is totally wrong to imagine all our shipyards are empty and the builders are going round cap in hand for business. I would like to boast at this stage and say the North-east Coast will complete a greater tonnage this year than ever before.

Labour relations in the shipyards were not as black as they were painted. Over the whole industry demarcation disputes were responsible only for losing about two minutes work a week per man.

Greenock Shipbuilders' 250th Birthday

VISIT by the Duke of Edinburgh marked the 250th anniversary on Monday of Scotts' Shipbuilding & Engineering Company, Limited, Greenock. He arrived by helicopter and was received by the chairman, Mr. M. A. Sinclair Scott. During a tour of the shipyard, the Duke unveiled a commemorative plaque.

Speaking to the 2,500 employees, the Duke said shipbuilding could be back at the top where it belonged if the whole industry, workers and management, got together. The company had always tried to keep up-to-date with advanced technique in design and manufacture and he saw no reason why it should not go on for another 250 years.

He was able to announce a "birthday present" for the yard—a £1,400,000 order for a 28,000-ton bulk carrier.

Factory Extension for Conveyancer Fork Trucks

BUILT at a cost of £2,200,000, a new factory extension and office block was opened last week at the Warrington (Lancs) works of Conveyancer Fork Trucks, Limited, by Sir Alfred Owen, a director of the company, and chairman of the Rubery Owen group of companies.

Among the research projects which are progressing at the factory is a design for a fully-mechanized hydraulic pit prop which is likely to have great advantages for the coal-mining industry.

A FERRITES factory has been inaugurated at Beaune, in Burgundy, by Cofelec, a joint subsidiary of four leading French firms; CSF, Thomson-Houston, Ugine, and Machines Bull.

The Government Does Not Understand British Industry

AMPLE evidence that the Government did not really understand British industry was alleged by Mr. Harold Burke, president of the Institution of Production Engineers and deputy chairman and joint managing director of Concentric, Limited, speaking at a meeting of the institution in London on Thursday of last week. Many of the Government's pronouncements indicated a lack of appreciation of some of management's most urgent day-to-day problems and there was no one in the present Government who could speak with real authority on manufacturing affairs.

Management by birth was no longer good enough for British industry, said Mr. Burke. The practice of filling managerial positions with relatives of "the boss" was becoming a thing of the past. Worldwide competition demanded the highest standards of education and training for anyone who aspired to a managerial position and there was a crying need for tremendous expansion of educational facilities for production engineering.

In spite of the lack of encouragement from high office, it was the obligation of every member of IPE to make a personal contribution towards achieving the immediate increase of not less than 3-4 per cent. in national production, the speaker insisted.

Exporting Electrical Equipment to Europe

PRESENTING a paper "Exporting to Europe" to the British Electrical and Allied Manufacturers' Association golden jubilee export conference in London recently, Sir William McFadzean, chairman of British Insulated Callender's Cables, Limited, and chairman of the Export Council for Europe, said that in his opinion prospects of exporting heavy electrical equipment to certain European countries were "not too good," but there was an unlimited field in electronics and lighter products.

Providing existing opportunities were seized promptly, a substantial expansion of British exports to Europe could certainly be achieved and, on balance, the picture was encouraging. Many firms were doing a first-class job already, but there were still too many stories of broken delivery promises and lack of service for this aspect of the situation to be shrugged off.

On the second day of the conference the 300 delegates formed groups to discuss aspects of export policy and problems.

DISTINGTON IRONFOUNDRY'S RECORD YEAR

RECORD deliveries of 111,723 tons of finished castings were made from the ironfoundry of Distington Engineering Company, Limited, a branch of the United Steel Companies, Limited, during the year ended September 30, 1961.

Exports of finished castings—such as ingot moulds—to continental steelworks accounted for a substantial proportion of the record deliveries, and these exports are now running at a new high level, despite strong competition from Common Market countries.

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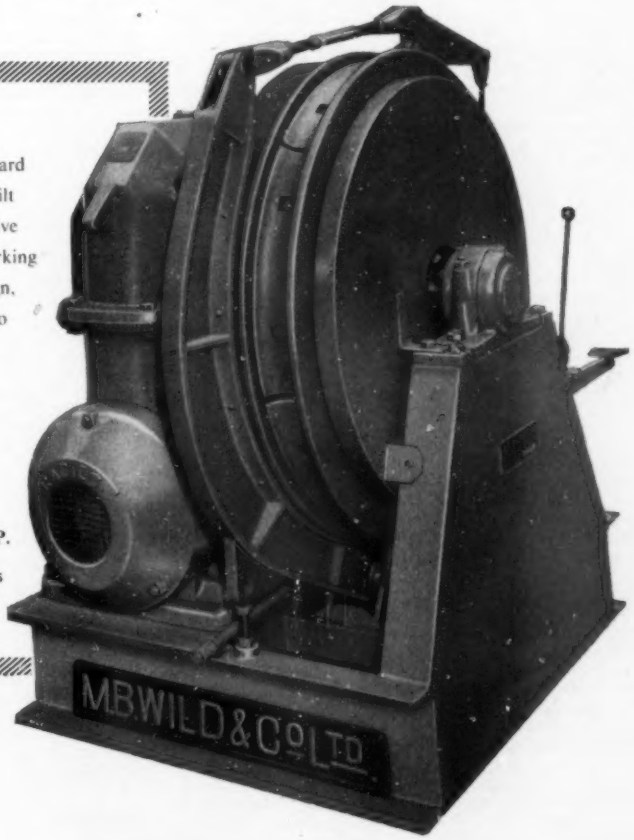

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NEWS IN BRIEF

LONDON OFFICES of the Universal Metallic Packing Company, Limited, Bradford, have been opened at 168, St. Stephen's House, Westminster, S.W.1, under the charge of Mr. E. Etherington.

CONSTRUCTION WORK on the new £4,250,000 Clyde graving dock was inaugurated by Mr. John S. Maclay, Secretary of State for Scotland, on Monday. When completed in 2½ years' time, the dock will be one of the largest in the world.

NORTH SWEDISH iron-ore mines at Kiruna produced 1,244,379 tons in September, the highest monthly figure ever achieved. The mines produce over 75 per cent. of Sweden's total iron-ore output and expect to turn out nearly 13,000,000 tons this year.

DIFFICULTIES HAVE ARISEN in the purchase by Glasgow Corporation of the administrative buildings of the North British Locomotive Company, Limited. The intention of the corporation is to turn the building into a technical college for engineering at higher levels.

THREE AMERICAN COMPANIES—Utah Construction & Engineering Company, Brown & Root, and Sud Americana—have been successful in securing the contracts for the next stage of the extensive Snowy Mountains hydro-electric scheme, in Australia. The orders are worth £16,710,000.

REPRESENTATIVES of management and workpeople associated with the Treforest (Glam), factory of K.L.G. Sparking Plugs, Limited, since it was commissioned as a wartime dispersal factory in October, 1940, were guests at a 21st anniversary celebration in Cardiff on Thursday of last week.

THE SECOND "split full-time" training course leading to the certificate in works management and to graduate membership of the Institution of Works Managers will open at the Technical College, Hendon, on November 6.

Certificates for £2,615,000 ordinary stock of Imperial Chemical Industries, Limited, have been posted to 63,000 employees under the company's profit-sharing scheme. This is more than twice the amount of stock handed over last year (£1,247,405), more than half of which was retained by ICI employees.

ONE OF THE LARGEST castings manufactured on Tyneside has been produced at the South Shields foundry of Charles W. Taylor & Son, Limited. The casting is a 20 ft. diameter circular "table" for a vertical boring machine at the Stockton-on-Tees works of Ashmore, Benson, Pease & Company, Limited.

THE 1,000th gear hobbing machine produced by Churchill Gear Machines, Limited, Blaydon-on-Tyne, has been delivered to Gresham & Craven, Limited, a company in the Westinghouse Brake & Signal Company, Limited, group. The machine is to be used for the production of components of the new Hobbs automatic gearbox.

THE TWO-YEAR-OLD ban on the recruitment of apprentices into the boilermaking trades in Sunderland's seven shipyards has been relaxed, said Mr. F. Cook, Wear district delegate of the Boilermakers' Society on Tuesday. Now there is less unemployment, the Wear committee of the Society has agreed to allow replacement of apprentice platers.

NEARLY 5,000 workmen at the Staveley Iron & Chemical Company, Limited, manufacturers of pig-iron, coke, etc., of Chesterfield (Derbyshire), who were concerned about their jobs when 500 men at the company's subsidiary, the Sheepbridge Company, Limited, were dismissed, were given a guarantee by the management last Friday that "under present market conditions there is no intention of closing down any further plant."

UNDER A non-contributory benefit scheme being introduced by John Brown & Company (Clydebank), Limited, for the company's shipyard and engineering workers, 4,000 employees between the ages of 25 and 65 will receive up to £300 when they retire. Managing director of the firm, Mr. John Brown, said that the decision had been prompted by the company's desire to retain its skilled men and to strengthen good labour relations.

AN 80-TON crane, of a new type produced by Babcock & Wilcox, Limited, London, N.W.1, is being introduced by the Fairfield Shipbuilding & Engineering Company, Limited, into the firm's Glasgow shipyard. It will be the heaviest travelling crane on the river and its installation will be one of a number of changes which have been made at the yard during the past few years as part of the firm's £4,000,000 modernization scheme, now nearing completion.

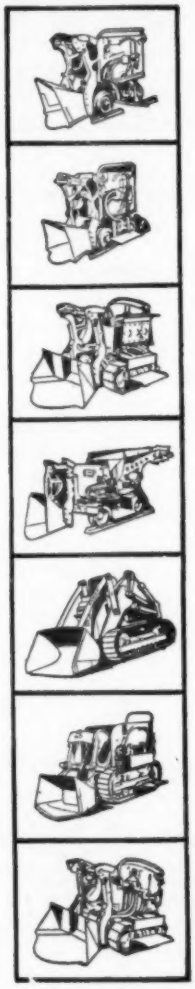
WATER TREATMENT equipment designed by William Boby & Company, Limited, Rickmansworth (Herts), is to be produced and marketed in Australia under an agreement with the Magnus Chemical Company (Pty), Limited, of Victoria. The concession applies to the whole range of Boby plant except where electrodialytic methods are involved. It is the second agreement of its kind that William Boby has reached with an oversea company this year.

FOLLOWING THE REPORT of the Brigg RDC medical officer of Health, Dr. J. S. Robertson, the council's public health committee is to investigate the possibility of pollution of water supplies from test boreholes sunk by Scunthorpe steel firms. Dr. Robertson said that the boreholes, in some cases hundreds of feet deep, were being sunk to assess the iron-ore reserves in the locality. Some of the holes were not being filled up but merely covered with a concrete slab and soil.

AS A PRELIMINARY STEP towards the full integration of Mirrlees, Bickerton & Day, Limited, and the National Gas & Oil Engine Company, Limited, in January, the spares departments of both concerns are being combined into one unit at Ashton-under-Lyne (Lancs) from November 6. Correspondence relating to spares should continue to be addressed to the company concerned, but all telephone inquiries from November 6 should be made to Ashton-under-Lyne 1861.

A NEW FACTORY, fully equipped and already producing Hydra rotary oil burners, has been built by Redheugh Iron & Steel Company, Limited, rollers of mild steel, etc., of Gateshead (Co. Durham), for Redheugh Hydra, Limited, the company formed last year when the Redheugh Iron & Steel Company, acquired the entire business previously carried out by Hydran Products, Limited. A separate section of the new factory, at Teams, Gateshead, is devoted to research and development.

VICKERS-ARMSTRONGS (ENGINEERS), LIMITED, a member of the Vickers group, announces cross licensing and selling agreements with Racine Hydraulics & Machinery, Inc., Racine, Wisconsin, USA. This reciprocal agreement will complement the Vickers "VSG" range of oil hydraulic equipment. Vickers-Armstrongs (Engineers), will manufacture Racine hydraulic equipment at its Weymouth Works and will distribute it throughout the Commonwealth and to European countries.



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CLASSIFIED ADVERTISEMENTS

PREPAID RATES: Fifteen words for 7/6 (minimum charge) and 4d. per word thereafter. Box Number 2/6 extra per insertion (including postage of replies). Situations wanted 2d. per word throughout.

Advertisements accompanied by a remittance and replies to Box Numbers should be addressed to the Advertisement Manager, Iron and Coal, John Adam House, 17/19, John Adam Street, London, W.C.2. If received by first post Tuesday, they can normally be accommodated in the next Friday's issue.

SITUATION WANTED

MINES INSPECTOR, just retired, last 14 years South Wales, seeks position as REPRESENTATIVE in South Western Division, for makers of mining equipment of all kinds. Box MI423, IRON AND COAL.

SITUATIONS VACANT

MINING ENGINEERS

A WELL established and expanding Company of manufacturers of mining machinery intend to appoint mining engineers to promote Hydraulic Powered Supports and other equipment in South Wales and the Midlands.

Applications are invited from ambitious and energetic men in the 23-35 age group. These are responsible and interesting posts. A good salary will be paid and a Pension Scheme is in operation.

Please apply in writing giving age, career to date and any other relevant information, in strict confidence.

Box ME424, IRON AND COAL.

EXCELLENT opportunity available for a TECHNICAL SALES ENGINEER of degree standard, to join rapidly growing steel fabrication company dealing directly with the N.C.B. and related contractors in anti-breakage coal shutes. Mining engineering experience is essential and he must be capable of preparing drawings and estimates on his own initiative. A generous basic salary is offered and commission on sales will be paid. Applications, with full details of experience and qualifications, to THE MANAGING DIRECTOR (G.S.M. 4), R. F. Luke (Structural Steel Works), Ltd., Oxcrost Works, Clowne, Nr. Chesterfield.

APPLICATIONS are invited for the post of two SERVICE ENGINEERS based in the North Eastern division of the N.C.B. to assist in the installation and maintenance of hydraulic coal face equipment. Applicants must have long experience in underground work preferably in the use of hydraulics. Applications stating full details of age, experience, etc., should be addressed to the MINING DIRECTOR, GULLICK LTD., P.O. Box 12, Wigan, to arrive not later than 27th October, 1961.

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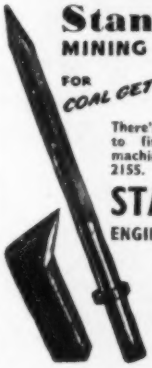

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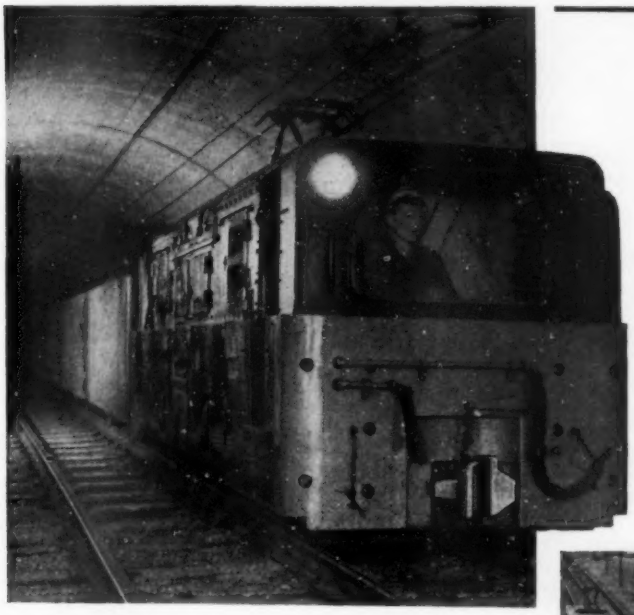

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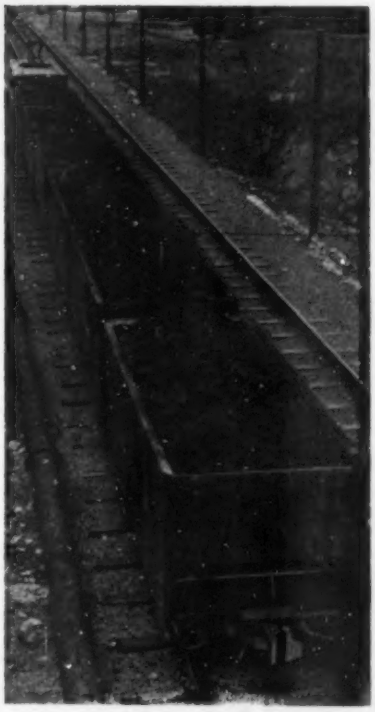

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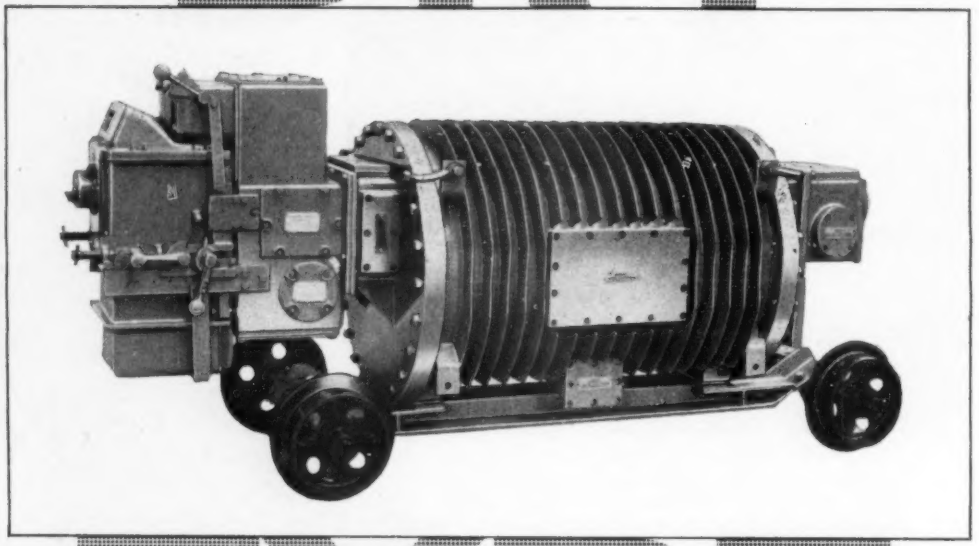

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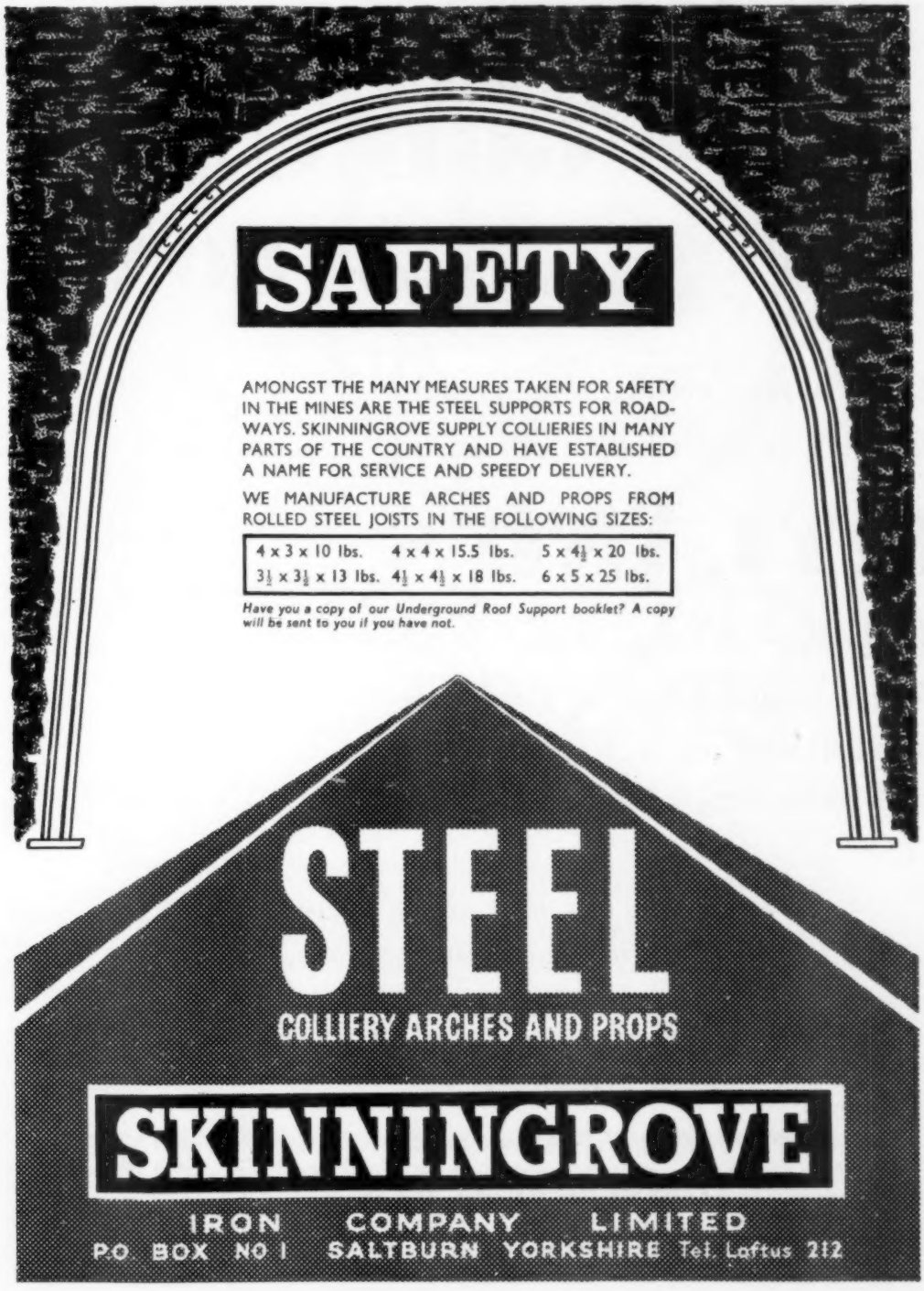
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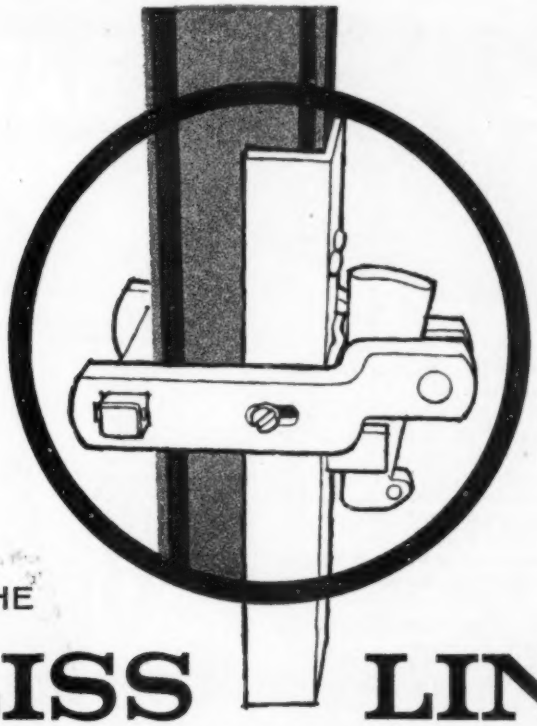

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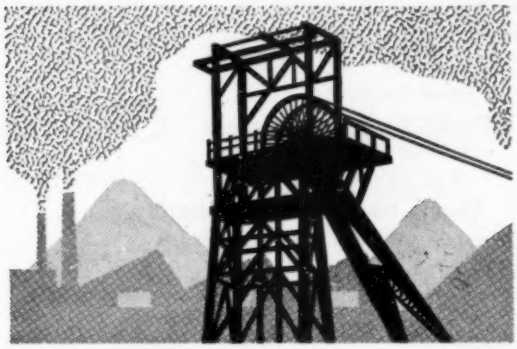

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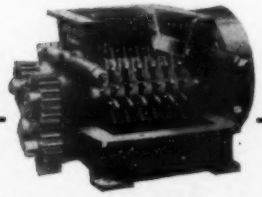

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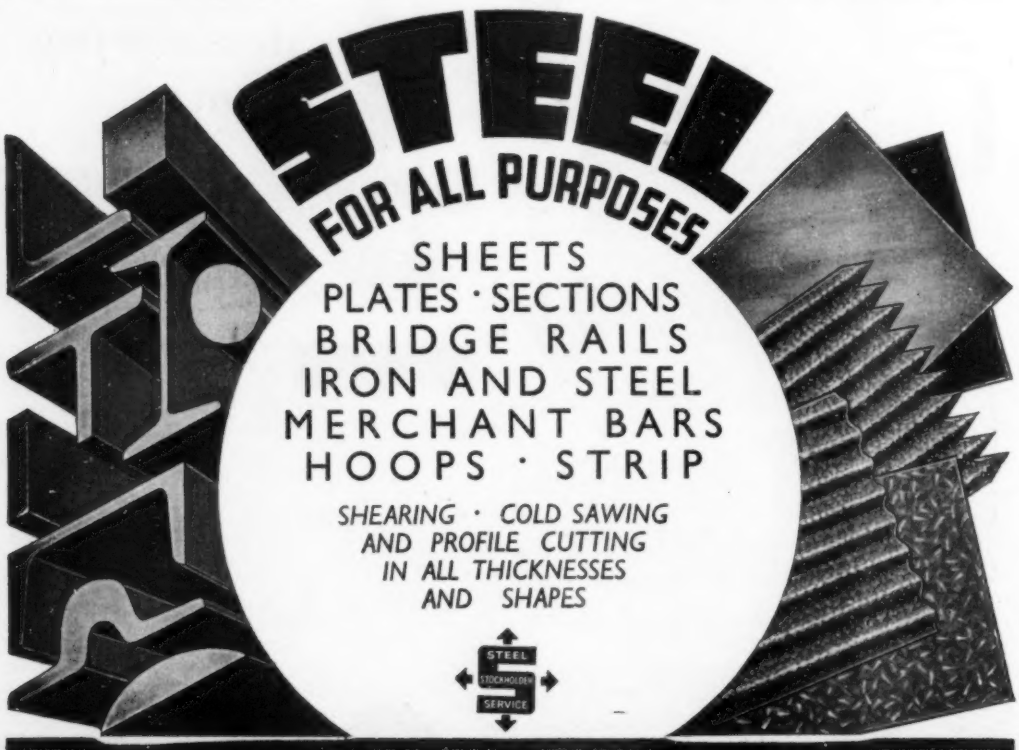

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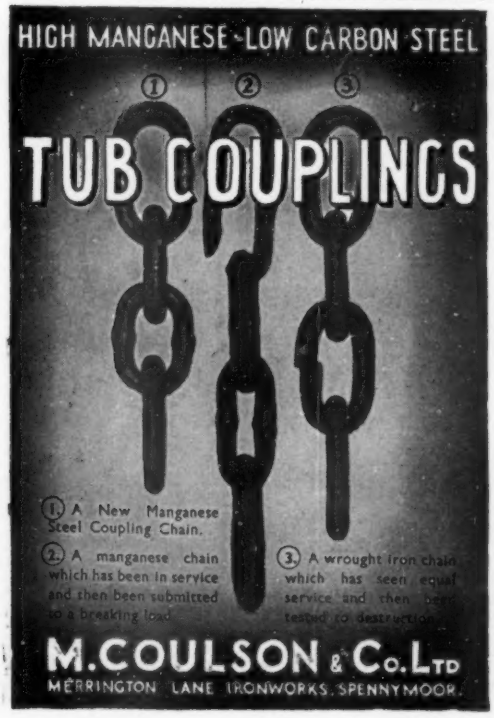
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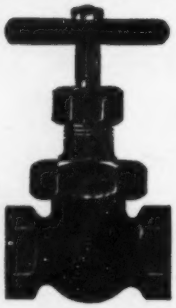

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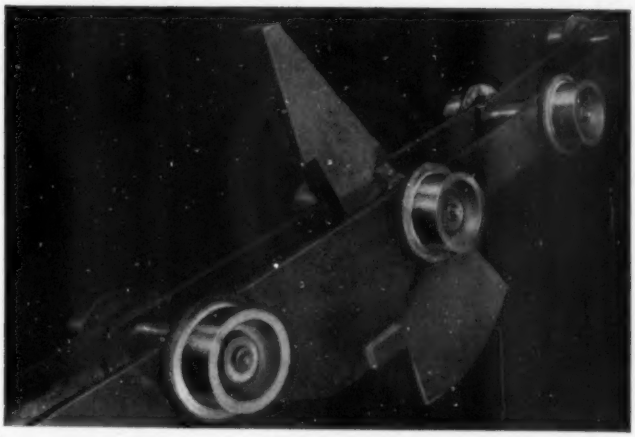

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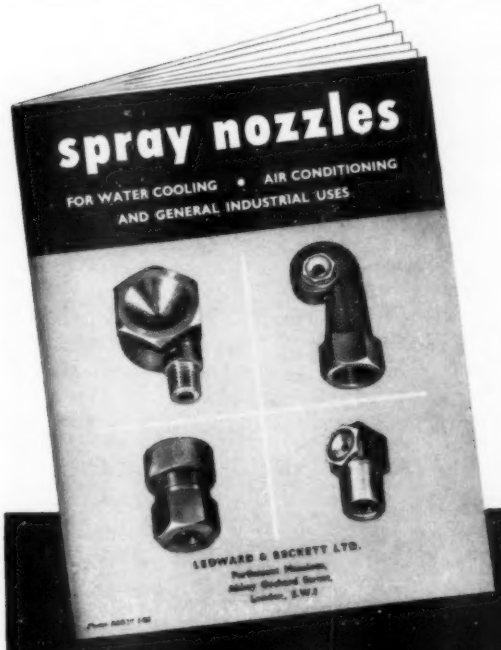

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